The Chemical Age

VOL LXI 20 AUGUST 1949 No 1571

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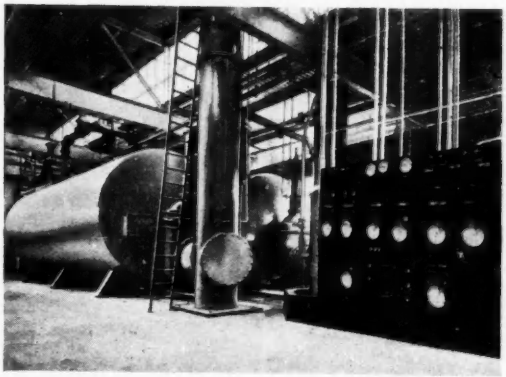

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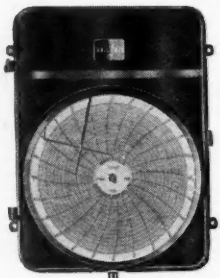

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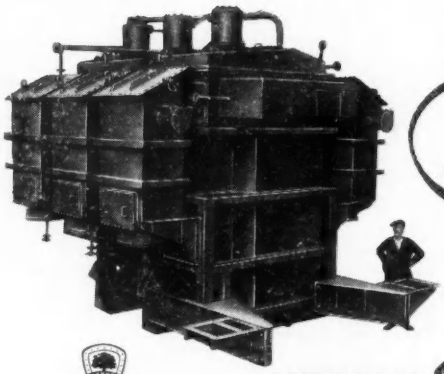

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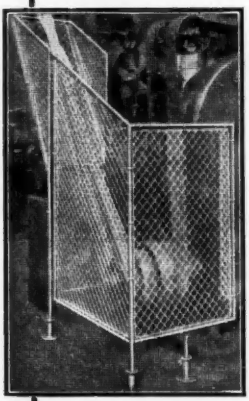

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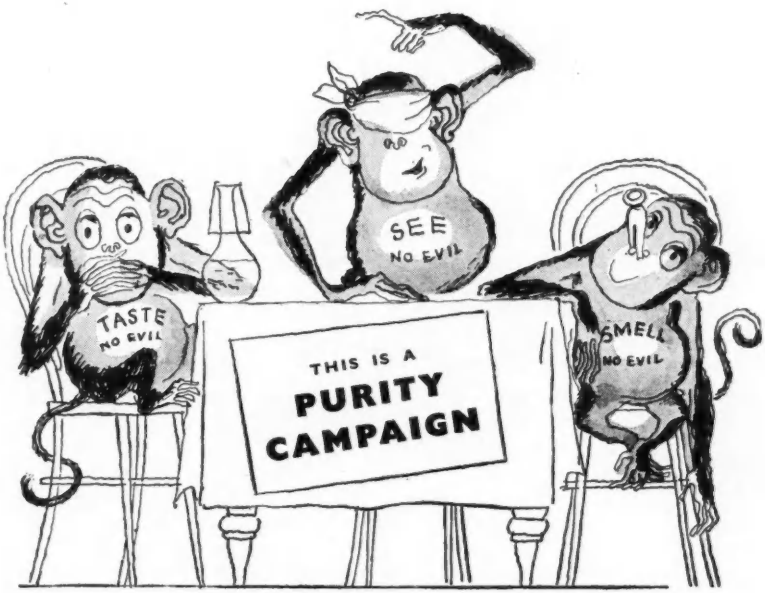

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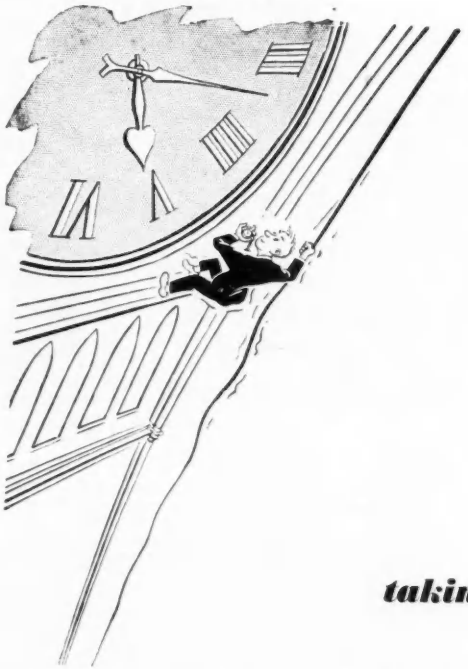

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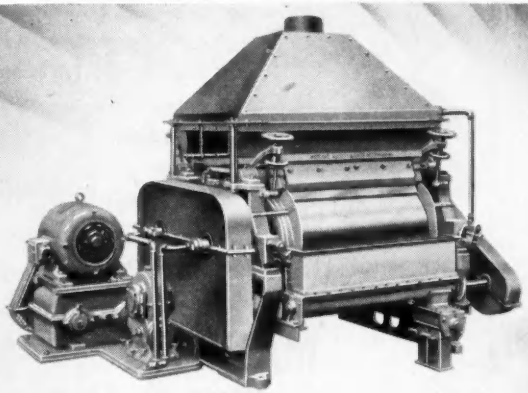

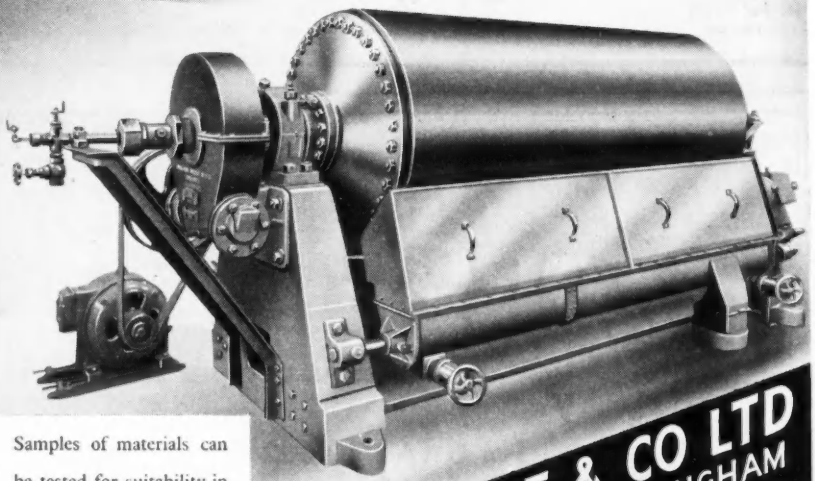

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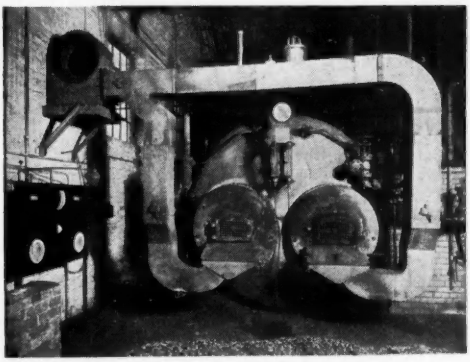

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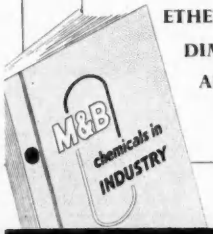

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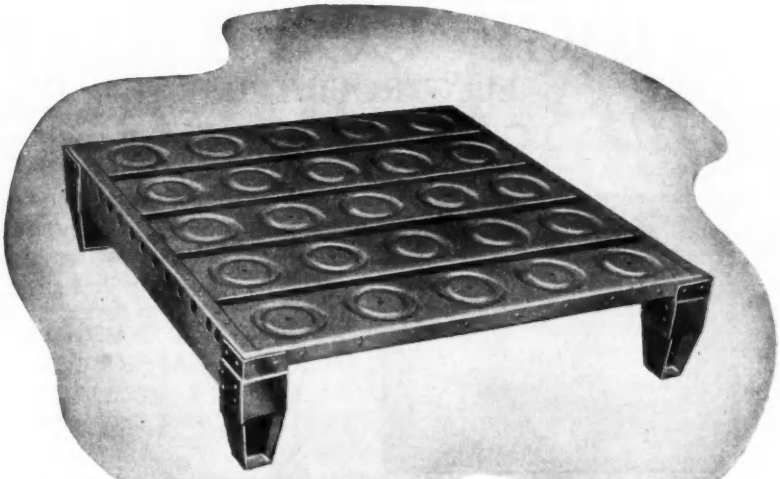

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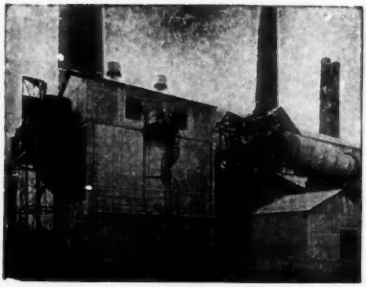

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Volume LXI 20 August 1949 Number 1571

Alkali Inspectors' Review

IN the absence of comprehensive periodical reports on chemical industry as a whole, of the kind which keep the country well informed of the fortunes of iron and steel production, the annual report of the Chief Inspector under the Alkali, etc., Works Regulation Acts serves as the most embracing summary available of the trend in affairs of a constantly widening field of chemical production. This recording service, which is called to mind once more by the current 85th annual "Report on Alkali, etc., Works," for 1948, is, of course, gratuitous and entirely incidental to the main purpose of the report. That is to record the progress of work done during the year by the two principal inspectors and five regional officers to minimise the release of dangerous or offensive emissions wherever specified chemical processes are carried on. While it appears to do that very adequately, the report repeatedly shows once again that the department has very little in common with a policing service, despite the fact that its vigilance is one of the essential safeguards against the creation of dangerous conditions in the vicinity of some chemical works, and that it takes wide view of its responsibilities for enabling chemical industries to develop economically and inoffensively. That is the characteristic which more than anything else must reconcile chemical managements to periodical visits by the alkali inspector and occasional demands for alteration of processes or equipment.

These people, unlike a rather large proportion of the officers who currently represent the administration in industrial affairs, are highly qualified, academically and in the practical affairs of the industry. The report leaves no room to doubt that those who compiled it are exceptionally well acquainted not only with the common sources of trouble between chemical operators and their neighbours but with the practical considerations of cost and shortage of certain supplies which must often determine what degree of improvement is possible. Because unreasonable demands are not made, this inspectorate has set up a tradition of good relations with the industry which has made much less onerous the joint responsibility of ensuring that chemical industries do not become "a reproach and a hissing."

The incidental function of reflecting what have been the changes in types and numbers of processes in the course of a year again brings to light a number of interesting data in the

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current report. The number of works with which the inspectors were concerned last year was 1083, employing 1766 separate processes. This indicates that since 1947, 68 plants have closed or given up the type of production with which the Alkali Works regulations are concerned, and there are 77 fewer of the scheduled processes. (For historical purposes it is interesting to recall that when the first Alkali Act became law in 1863 it concerned in all only about 80 works.) The report goes on to show how this apparent loss to chemical production is accounted for and what has been the real effect. Most of it has been associated with by-products of coal carbonisation. Temporary cessation of benzol recovery, for example, eliminated 36 processes; the concentration of tar distillation at centralised plants brought to an end 19 others; and the abandonment of ammonia recovery disposed of 21 more. This "reduction," the report confirms, is only apparent. The inescapable need to centralise production into larger units has been narrowing the field, certainly since the present Act took effect in 1906. Then there were 1230 scheduled works operating 1830 processes, although the legislation covered a smaller field than it does now. "Although fewer works were registered," says the report, "this does not mean there has been any corresponding reduction in production. Indeed, speaking by and large, production in most branches of the heavy chemical industry is greater than at any previous time."

One of the most satisfactory evidences that the high productive level is being maintained is concerned with the sulphuric acid plants, whose output, exclusive of much of the yield from Government factories, is stated to have represented a rise of some 180,000 tons above the total produced in 1947. That is, of course, a direct reflection of corresponding widening of activity in numbers of other chemical industries, notably that responsible for chemical fertilisers. Heightened demand has produced one interesting result, reversing a trend which the report observes, has continued for some 20 years; 42.7 per cent of the 1,318,000 tons, calculated as 100 per cent acid, came from chamber process equipment, which

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Notes and Comments

An Inert Gas Compound

FROM time to time various claims have been made that compounds of the inert gases have been prepared. So far, none of them has been conspicuously substantiated, but a recent claim by Dr. H. M. Powell, of Oxford, and Dr. Mark Guter, of the British Oxygen Company, appears likely to withstand critical examination. Arising out of Dr. Powell's earlier work on clathrate compounds in which one molecular component forms an enclosing structure trapping the second component (for which the first need have little specific attraction) came the suggestion that if hydroquinone was crystallised from a solution saturated with argon at a high pressure some of the argon might be entrapped in the hydroquinone crystals. Experiments have fully confirmed this suggestion. Hydroquinone crystallised from benzene under 20 atm. pressure of argon was found to evolve considerable quantities of the gas when dissolved in water. This result is clearly of more than academic interest, as it opens up the possibility of a very convenient and simple method of storage, transport and dosage of the inert gas without the necessity for cumbersome steel cylinders or fragile glass containers.

Economic Crisis

A TIMELY statement on the economic situation existing in this country has been issued to its large membership by the Federation of British Industries, which expresses apparently justifiable concern at the grave danger of Britain being unable to obtain the food and raw materials it needs and utters a warning of the likelihood that we shall soon have to face further austerity and unemployment unless some prompt solution to our difficulties is found. Among the steps necessary to be taken, says the statement, is that taxation, and therefore Government expenditure, must come down, the high taxation which we now bear being itself a direct cause of high costs. Commenting on controls, the Grand Council of the FBI, which issues the statement, opines that the rigidity of the planning of our economic life should be relaxed. Controls, it says, have undoubtedly been reduced in number, but more could be abandoned. Price mechanism will, as it has in the past, apply the necessary correctives. The spur of competition is still the most effective aid to efficiency! We must concentrate on the things that matter. Such schemes as the nationalisation of iron and steel are irrelevant to our present crisis, distracting to those who should be concentrating on production and marketing problems, and damaging to our future prospects. Everyone engaged in industry must strain every nerve to cheapen methods of production, to abandon restrictive practices, and to adopt all possible aids to increased productivity, exhorts the FBI statement.

Sources of Shortage

NOTHING illuminates more revealingly the problem of manufacturers' inability to cut prices in obedience to the demand for continued expansion of overseas trade than the penetrating commentary offered each year by Sir Geoffrey Heyworth. As chairman of Lever Brothers & Unilever, Ltd., his speech to shareholders at the annual meeting of the company last week was necessarily concerned chiefly with oils and fats, but his analysis of the unbalanced distribution of raw materials which lies at the root of so many trading problems, was patently worth the attention of a very much wider audience. His views about bulk buying, by Governments or any other agencies, fully confirm what most people feel about this inelastic system, which seems to yield advantage to none

in the buying country area and certainly does not produce cordial relations with the sellers. Sir Geoffrey Heyworth, however, is under no illusion that the present unbalanced state of essential supplies around the world can be righted by intelligent buying alone. His very expert analysis of oil and fats economics offered at least one reassuring note: world production has nearly regained pre-war levels. There should by now be sufficient for all, but for the estimated increase of 8 per cent in populations and the currency deadlock.

Colonial Minerals

THE survey undertaken by the Metals and Minerals Panel of the Colonial Primary Products Commission (No. 247, Colonial Office, 9d.) is a valuable and matter-of-fact report, even if it does belatedly underline the truism stressed in THE CHEMICAL AGE, March 5, 1949, that the present scarcity of geologists is a limiting factor in assessing the mineral wealth of the Colonial Empire. It is interesting to note that plant is being erected to double the present Northern Rhodesian output of electrolytically refined copper —now 60,000 tons per annum. This project will become a specially valuable dollar earner and so fulfil one of the major objects of the survey. If, however, the mineral resources of the Colonies are to be exploited, who is to supply the capital? Hardly the private investor who has always regarded money for mining purposes as being essentially risk capital. Over several decades the £260 million which it is estimated has been sunk in mines south of the Sahara has yielded an average of barely 4 per cent per annum. But there was always the possibility, no matter how remote, of a spectacular return which attracted speculators whose money and enterprise made London the world centre of mining finance. Under Socialism, even these ephemeral rewards are earmarked for the State. The successful mining of minerals depends ultimately upon an adequate and reliable labour force guided by an unfettered management. A combination of realism and imagination is required, but not of the kind that recently located phantom tigers in Africa in order to boost the achievements of an individual who saw none of the bogies conjured up by the Government department concerned. The Socialist state is not suited for the development of Colonial mining enterprises excepting perhaps in respect of minerals required of strategic importance that cannot be recovered economically. But the report under review specifically does not deal with minerals in this category.

ALKALI INSPECTOR'S REVIEW

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yielded only 40.2 per cent of the previous year's total. The contribution of the more widely used contact plant was correspondingly reduced, although its total yield was some 75,000 tons more. The size of individual chamber process works has been increased, for there were last year only 54 such works, contrasting with 92 in 1928. The revival of interest in chamber plant production, however, is unlikely to outlast the present need for acid and relative shortage of plant. In 18 instances the total acidity of emissions from such plants exceeded the statutory 4 gr., as SO_3 per cu. ft., while the average emission from contact plants was 3.28 gr., which was reduced to 1 gr. where washing equipment exists. The proper working of chamber plants demands continued skilful attention which, as the report observes, is not readily secured to-day.

In this, as in all the other departments they supervise, the alkali inspectors have shown a willingness to moderate their demands in the light of current needs and difficulties. At old contact acid works only escapes corresponding with more than 5 per cent of the sulphur burned are being regarded as infractions of the regulations.

METAL PRICE CHANGES

Aluminium Chrome and Steel

AN increase in the price of virgin aluminium in ingot form was announced by the Ministry of Supply as from Monday last (August 15). The price was raised from £90 to £93 per ton, delivered into consumers' works, with the addition of £2 10s. per ton for metal in notch bar form.

The new price will apply to metal of a purity of 99 per cent to 99.5 per cent inclusive, and the existing premiums for higher purities will be payable in addition as follows:—

Purity	*Premium per ton*
Minimum 99.6 per cent	£8 0 0
,, 99.7 ,, ,,	£12 0 0
,, 99.8 ,, ,,	£17 0 0
,, 99.9 ,, ,,	£50 0 0
,, 99.99 ,, ,,	£100 0 0

The change is stated to be due to a rise in the average cost of current supplies.

A reduction in the selling price of Baluchistan chrome by 10s. per ton, was also announced by the Ministry of Supply, effective from the same date (August 15).

The new price is £11 1s. 9d per ton delivered direct ex ship, and £11 17s. per ton for deliveries ex store, and includes carriage charges to railpoint nearest to consumers' works.

The decrease follows reduction in the freight rates from India.

Maximum prices of certain iron and steel products were altered as from Tuesday last (August 16), by an Order made by the Minister of Supply.

Principal alterations were:—(1) Reductions in the prices of galvanised sheets, tubes, wire nails, terneplate and alloy steel black bars, and (2) an increase in the price of alloy steel bright bars.

Copies of the Order—the Control of Iron and Steel (No. 73) Order, 1939—can be obtained from H.M. Stationery Office or from any bookseller.

Scottish Steel Record Anticipated

SCOTTISH steel production, which set up new high levels for the first six months of 1949, is expected to reach a record total of almost 2.5 million tons in 1949. The steel industry's only fear, a shortage of fuel, is offset by the fact that stocks of coal are better than they were a year ago. Supplies of ore, limestone, and other materials have also improved.

SCIENTIFIC FILMS

Brussels Congress and Festival

DELEGATES from many countries will discuss various aspects of the importance of scientific films when the Third International Scientific Film Congress meets in Brussels during September 30-October 5.

Among the reports presented by sub-committees will be one on a standard method for cataloguing and recording information about scientific films and another on customs regulations in relation to their international exchange.

A festival of scientific films will be held in conjunction with the congress. This will include four public sessions with films dealing with research, education, and scientific documentary. There will also be an exhibition of medical films, for doctors, students, and others who have interests in medicine.

Four sessions covering research, industry, education and medicine will be reserved for specialists.

The Scientific Film Association of Great Britain is considering the films to be submitted as the British entry in the festival and wishes to hear of privately produced films which would be suitable for inclusion.

INDUSTRIAL SAFETY

THE safe use of solvents, installation and maintenance of breathing apparatus, and the use of electrical apparatus in hazardous atmospheres, are among the subjects to be discussed at the residential conference which will be held at Scarborough from October 7-9.

The conference is being organised by the Royal Society for the Prevention of Accidents on behalf of the Association of British Chemical Manufacturers. It will be on similar lines to the safety conference held at Harrogate last year, and although mainly devoted to chemical aspects, will be of general interest to other industries.

Sir Harry Jephcott (Glaxo Laboratories, Ltd.), will open the conference. Other speakers will include Dr. A. J. Amor (president, Association of Industrial Medical Officers), Mr. T. Senior (Imperial Chemical Industries, Ltd.), and Mr. S. W. Richards (General Electric Co., Ltd.).

The programme will include a Brains Trust at which Mr. H. R. Payne, chairman of the works safety committee, ABCM, will act as question master.

Basic Chemicals in May

Little Change in Production and Consumption Levels

LEVELS of production, consumption and stocks of some basic chemicals remained steady in May, and there was little change noticeable by comparison with May, 1948.

Estimated numbers employed in the chemical and allied trades rose slightly to a total of 432 thousand, the same as in March this year. Distribution of workers (in thousands) was as follows: coke ovens, chemicals and dyes, and explosives 249.6 (183.0 men, 66.6 women); paints and varnishes 37.6 (26.3 men, 11.3 women); oils, greases, glue, etc., 64.0 (50.9 men, 13.1 women); pharmaceutical, toilet preparations, etc., 80.8 (40.9 men, 39.9 women).

These figures and the representative tables given below are contained in the latest issue of the *Monthly Digest of Statistics* No. 43, July (HMSO, 2s. 6d.).

	May, 1949 Thousand Tons			May, 1948 Thousand Tons		
	Production	Consumption	Stocks	Production	Consumption	Stocks
Sulphuric acid	137.4*	139.0	—	127.4	125.0	—
Sulphur	—	25.3*	94.6*	—	21.7*	86.6*
Pyrites	—	18.1*	71.0*	—	18.3*	71.0*
Spent oxide	—	16.3*	171.6*	—	15.4*	166.7*
Molasses (cane and beet)	10.9	24.5†	283.5	11.3	24.9	198.4
Industrial alcohol (mil. bulk gal.)	1.77	1.94	4.9	1.65	2.28	6.46
Superphosphate	17.6	14.4	—	18.3	15.2	—
Compound fertilisers	(No figures available)			100.1	80.0	—
Liming materials	—	537.7	—	—	450.8	—
Ammonia	—	6.8*‡	5.91	—	6.36*‡	5.24
Phosphate rock	(No figures available)			—	79.7	194.2
Virgin aluminium	2.68	15.6	—	2.51	12.1	—
Virgin copper	—	25.8	117.5	—	28.9	90.1
Virgin zinc	—	14.3	60.7	—	17.9	47.6
Refined lead	—	13.8	46.7	—	16.3	32.4
Tin	—	1.7	20.4	—	2.15	13.2
Zinc concentrates	—	14.4	28.0	—	14.9	63.0
Magnesium	0.55	0.43	—	0.18	0.19	—
Pig iron	186.0*‡	—	303.0*	181.0*‡	—	190.0*‡
Steel ingots and castings (including alloys)	301.0*‡	—	1,121.0	297.0*‡	—	846.0
Rubber: Reclaimed	0.43	0.38	3.83	0.54	0.49	3.89
Natural (including latex)	—	3.65	46.0	—	4.22	137.9
Synthetic	—	0.07	1.86	—	0.05	2.02

* June. † Distilling only. ‡ Average of five weeks.

A WARNING ON POLONIUM RADIATION RISKS

THE danger associated with the casual use of static eliminator devices made of polonium is emphasised by a warning recently issued by the University of California's atomic energy project, Los Angeles.

Based upon a survey by Bryan and Silverman, of the university's medical school atomic research group, this report points out that serious radiation hazards may develop in the area around the devices which have been produced to eliminate static charges through the employment of thin strips of the element polonium.

Polonium, used commercially, is effective in eliminating static electricity produced by belts and pulleys, paper passing over metal rolls and other machinery. It emits alpha particles to form a conductive layer of ionized air between the dielectric material and a portion of the machine which is grounded. A survey of industrial plants in the Los Angeles area has revealed dangerous radioactivity in the area in which static eliminator devices were stored.

The radiation of polonium, Dr. Bryan points out, does not penetrate the skin, but an internal hazard may develop from radioactive particles absorbed by inhalation or hand-to-mouth contact. The report recommends such static eliminators be used only when suitable monitoring instruments are available and workers are properly trained to handle radioactive material.

CHEMICALS IN DAILY LIFE

Service in Home and Industry

A FURTHER example of enterprise by Monsanto Chemicals, Ltd., in attempting to make sure its workers and others have a clear picture of the part played by its chemical products in everyday life, was a "Meet Monsanto" exhibition at the Congregational chapel hall in Cefn Mawr, some two miles from Ruabon.

The exhibition included a special display of the new development manufactures, Syton, Santomerse and petroleum chemicals, with an almost full range of samples of all the Monsanto chemical products. There were also parallel exhibits of consumer goods in which these chemicals are embodied, showing their many applications in daily life both at home and abroad.

A display of excellent photographs showing activities at the Ruabon plant and other factories in industry where Monsanto chemicals play some important part in manufacturing processes, attracted much attention.

By way of an original "guide" to the exhibition the company issued an entertaining booklet showing some of the ways in which Monsanto products affect the home.

REMOVABLE WALL COATING

Protection of Laboratories

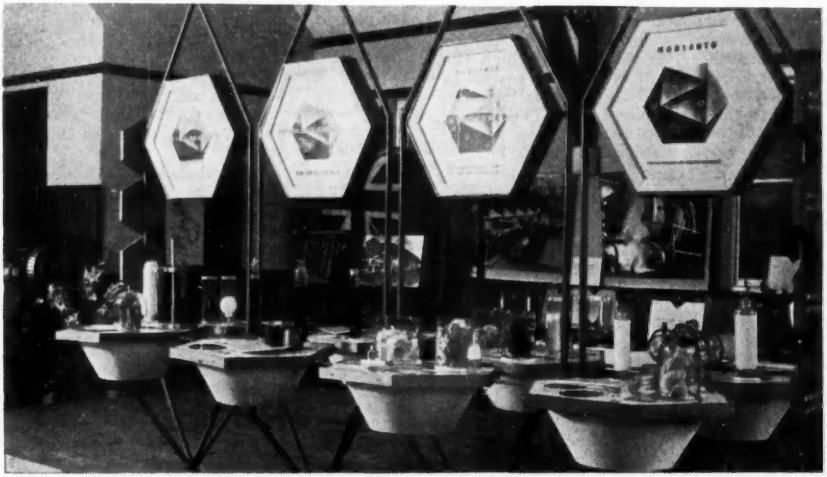
WHAT is believed to offer a partial solution of the most serious health hazards of atomic research—radioactive pollution of laboratories and factories—is reported by Dr. A. Carleton Jealous, a chemical engineer of the Oak Ridge National Laboratory, Tennessee, U.S.A.

Experimental use of a removable plastic wallpaper is described in the report, which summarises the conclusions of a large number of scientists and engineers engaged in the development of atomic energy.

Easy to Strip Off

Laboratory units have been covered with three coats of dense paint known as Prufcoat, over which is sprayed a thin rubbery film called Cocoon. It is expected that this type of coating will make it possible to strip off contaminated sections of the outer wall coating and replace them with new layers.

To complete the work, for a small unit, this method takes 48 man-hours, requires five days for drying, and costs about $155, Dr. Jealous states. It would, however, obviate the necessity of employing labour for scouring porous concrete walls to eliminate absorbed radioactive materials.



Some of the development products seen at the "Meet Monsanto" exhibition, at Cefn Mawr. These include sodium benzoate used for medicinal, food, and industrial purposes; Santomerse No. 1, a modern all-purpose detergent and wetting agent, and Syton, an anti-slip agent used in the initial preparation of wool fibres

LESSENING ATMOSPHERIC POLLUTION

Progress Report by the Alkali Inspectors

THE considerable widening in recent years of the duties undertaken by the inspectors appointed under the Alkali, etc., Works Regulation Act and the subsequent Works Orders continued during 1948, as is shown in the current 85th report of the chief inspectors (SO, 32-1-0-48; 9d.).

The work of ensuring that the emission of toxic or offensive fumes or gases, etc., is kept to the practicable minimum has latterly involved close attention by the chief and deputy inspectors (Mr. W. A. Damon and Dr. J. S. Carter) and the six regional officers to a variety of plants with which in the past this department was not concerned. Of a total of 3772 inspections carried out during 1948, 524 visits were to processes not covered by the Alakali Acts, notably to electricity undertakings and similar large-scale steam raising installations, the smoke and dust producing capacity of which has latterly received very critical attention. It is significant that, of 80 complaints made to the inspectors, 40 related to unregistered processes.

Metallurgical Furnaces

The other section of unregistered processes to which the inspectors have given much attention is represented by metallurgical furnaces, in relation to which the inspectors have in a number of instances provided technical advice enabling the discharge to the atmosphere to be minimised, often with beneficial recoveries or economies of process materials.

Summarising the evidence obtained during the year's inspection of processes scheduled under the Act and its additions, the chief inspector records that there was again only one instance of escape of hydrochloric acid gas in excess of the limit prescribed in Section I of the Act (0.2 gr. HCl per cu. ft.), but in 18 cases emissions from sulphuric acid works exceeded the prescribed limit of 4 gr. SO_3 per cu. ft. In no case has it been necessary to institute legal proceedings, and throughout the report there is renewed evidence that the inspectorate and the industries have collaborated on very amicable terms to ensure that chemical processes were carried out " by the best practicable means." It is apparent that full allowance has again been made for the practical difficulties in ensuring the trapping of offensive matters imposed by the continued shortage of certain forms of chemical and industrial equipment.

The alkali works, for which the Act was originally designed, are shown to have maintained a high standard of recovery. Report is made of only one breach of the regulations, in a newly registered salteake works, and this is regarded as having been only a technical offence. Some leakage of gas into the fire flues produced on one occasion a concentration of 0.4 gr. HCl per cu. ft. In general, says the report, the operational standard has been good.

Chlorine is occasionally found in small amounts in the waste gases from alkali processes and various theories, *e.g.*, presence of manganese compounds have been put forward to explain its occurrence. At one works small quantities were being formed within the furnace. No satisfactory explanation has as yet been found although the opinion has been advanced that the asbestos with which the rabble arms are covered is having some catalytic effect.

Of sulphuric acid production, the report records that up to last year there had been a steady decline in the proportion of sulphuric acid made by the chamber process for the past 20 years, but the total amount had remained fairly constant at about 500,000 tons (as 100 per cent acid) annually. The size of individual works had however increased, the same production being achieved at 54 works in 1948 as at 92 works in 1928.

Even with the substantially increased capacity which will be provided by new plants due to come into production in 1949, it seemed likely that the demand would outstrip supply for some time to come.

Sulphuric Acid

During the year 18 instances were recorded when the total acidity of escapes were found to be in excess of the statutory 4 gr. as SO_3 per cu. ft. and the average of all escape tests made was a trifle higher than that of last year. The inspectors record that it was generally found on their arrival at works that steps had already been taken to rectify high escapes and that plants were consequently reverting to normal conditions.

A matter of some interest which may have an influence on the design of sulphuric acid plants is the installation of a

Katchkaroff plant on a pilot scale at one of the London works inspected. This is an intensively working unit which occupies less space than chamber, or even tower, plants of equal production capacity. Plants are known to be in satisfactory operation abroad, using pyrites. In the London works it is proposed to burn native spent oxide. The nitre consumption and the exit gas are reputed to be exceptionally low.

Of the contact acid production plants, the report discloses that the average of all official tests on escapes from plants was 3.28 gr. as SO_3 per cu. ft. The average at plants where washing is practised was 1.0 gr. and at the remainder 4.3 gr. While this cannot be considered satisfactory, it must be remembered that the demand for acid has led to rather intensive working which, of course, is not favourable to the maintenance of low escapes.

The advantages of operating a four-pass converter, such as that employed in June in one plant for the first time are recorded. Here the average total acidity of the escape had been below 2.0 gr. per cu. ft., which is equivalent to less than 2 per cent of the sulphur burned. It was unfortunate that for some reason not yet established, the escape was misty and had a tendency to drift to ground level. Complaints of choking fumes had been made in the neighbourhood.

Although it had been thought reasonable to specify that escapes from new plants should correspond to not more than 2 per cent of the sulphur burned it has been appreciated that such an efficiency is not to be expected in the case of the older plants. District inspectors have therefore been instructed to regard as infractions of the Act only such escapes at old works as correspond to more than 5 per cent of the sulphur burned.

Treatment of Catalysts

The inspectors have been able to offer some technical reminders, based on their observations of causes of unsatisfactory operation, relating to the treatment of catalysts. It is pointed out that, restarting plants which have been idle, if the temperature of the catalyst has fallen below its ignition point (usually just above 490° C. in the case of vanadium catalyst) it should be raised gradually by the alternate combustion of oil in the sulphur burner and the blowing of hot air through the convertors. Sulphur dioxide should never be passed through a convertor before the temperature of the catalyst has been raised above its ignition point.

From time to time it is necessary to remove the catalyst for screening so as to free it from dust. It is a great advantage to add a few inches of new mass after the old screened mass has been replaced, because it is known that the ignition temperature tends to rise with continued use.

The report pays recognition to the increasing importance of chemical fertiliser plants, about which it notes that the number of works registered in 1948 was 34, compared with 41 in 1938, 75 in 1928, and 128 in 1920. Production of superphosphate was, however, greater than at any time—about one million tons per annum compared with half a million tons ten years ago. There has been an appreciable concentration of production at fewer units. The great bulk of superphosphate was now made in continuous mechanical dens and mixers. More granulating units had come into operation and at least two plants for the production of triple superphosphate were under consideration.

Superphosphate Works

Although there had been some improvement, the position at superphosphate works was not yet entirely satisfactory. The average acidity of the escapes, 0.12 gr. per cu. ft. calculated as the sulphur trioxide equivalent of hydrofluosilicic acid, was lower than the 1947 figure, 0.13 gr, but higher than the pre-war figure of 0.06 to 0.08 per cu. ft. The acidities were admittedly small, but the aim at superphosphate plants had always been to reduce the acidity to the lowest possible figure.

The acid gases evolved in the production of superphosphate were readily removed by scrubbing, but the need for increased production had caused some neglect of scrubbers and sprays.

No serious criticism is offered of the general standard of operation of nitric acid, chlorine and muriatic acid plants.

The sulphide processes cover one of the widest fields of production with which the inspectors were concerned and it was observed that the hydrogen sulphide released from the various works varied from almost pure gas to concentrations of only parts per million. These emissions were liable to be contaminated with organic compounds. The department was still intent on eliminating hydrogen sulphide from all such emissions and the means generally being employed were regarded as satisfactory, except in viscose works.

Progress in the installation of remedial plant at viscose works was disappointing. Waste gas treatment involves appreciable capital and running costs, difficulties had

(*continued overleaf*)

Ceylon May Produce Rubber

Reaction to Market Difficulties

THE Conversion of raw rubber in Ceylon to processed goods of higher value for which there is relatively much wider demand is advocated by the rubber technologist of the Ceylon Ministry of Industries, Dr. A. Sunderalingam, as the only hope for the survival of the local rubber industry.

He estimates, however, that only 5000 tons per year of Ceylon's annual rubber output of 90,000 tons can be used for the local manufacture of goods within the next five years.

Laboratory and pilot factory experiments so far have indicated that Ceylon rubber is convertible to many higher-priced types of processed rubber. The types which have been subjects of experiment were softened rubber for the production of smoked sheets, carbon black rubber, nitrate crumb, rubber powder designed on the lines of the patented stamp process, and concentrated latex. Concentrated latex is produced in three forms—the Revertex concentrated form of latex, centrifuged rubber and creamed latex.

The production of latex crêpe (pale crêpe) and sole crêpe offers promising commercial prospects. This white or near-white product has no substitute in the synthetic field which lends itself so readily to successful colour tinting. Chemical rubbers, such as chlorinated rubber used on roads and in the preparation of paints, and rubber hydrochloride, also command a world market, states Dr. Sunderalingam. Rubber hydrochloride, of which Pliofilm is a successful example, has a variety of commercial uses. Ceylon, says Dr. Sunderalingam, can make effective use of this cellophane-like product in packing tea. It will guarantee complete preservation and at the same time leave the selling commodity visible.

The conversion of raw rubber to these marketable processed types, Dr. Sunderalingam points out, is a task in which the Government and planting and commercial interests should collaborate. He does not exclude the incorporation of foreign commercial interests, which will also mean the inflow of foreign capital to finance the enterprises.

The difficulty of ensuring a regular supply of latex is the main cause for the delay in establishing the proposed Government rubber crêpe factory. It has been estimated that the factory will need at least 1000 gal. of latex a day if it is to be an economic proposition.

In the event of the Government failing to obtain a regular contractor for the latex, it is likely that a factory for the production of rubber seed oil and softened crêpe will be established on the site selected for the crêpe factory.

LESSENING ATMOSPHERIC POLLUTION

(*continued from previous page*)

been experienced in obtaining constructional materials and there had been a general shortage of caustic soda. Simple scrubbing with caustic soda had been shown to give extremely effective removal of hydrogen sulphide.

The method had the disadvantage that it involves some wastage of soda in the removal of carbon dioxide and a sulphide effluent disposal problem. Tests were being made to apply the Courtauld catalytic scrubbing method (described in the 82nd Report).

The practice of de-gassing spinning room acid with absorption of the evolved hydrogen sulphide in caustic soda continued to spread. This was all to the good, but was not sufficient by itself and in due course all works would have to employ suitable methods for the treatment of the main volume of waste gases.

While the recovery of benzol at gas works had been on a diminished scale—there were 36 fewer works in 1948—the inspectors found cause for complaint in the operation of several of the existing plants.

In one instance a new plant had been brought into operation without any provision being made for dealing with uncondensed gases. The works management and the contractors who built the plant were equally to blame for this singular omission for both should have been aware of the obligation to provide the proper means, says the report. On the matter being brought to the owner's notice, a connection to the gas exhausters was immediately made which allowed the uncondensed gases to be drawn into the main gas stream.

APPLIED SCIENCE AND ENGINEERING

Some Notable Displays at Olympia

THE Engineering and Marine Exhibition, incorporating the Welding Exhibition, which opens at Olympia, London, on Thursday next (August 25) and continues until Saturday, September 10, promises to provide a very representative review of what has lately been achieved in adapting to contemporary needs designs in chemical and metallurgical processing plant, automatic and metering devices and power raising equipment.

The exhibition is being held with the active support of the British Engineers' Association, the Society of Motor Manufacturers and Traders (Marine Section), the British Electrical and Allied Manufacturers' Association, the Institute of Welding, and the British Acetylene Association.

The following particulars of some of the exhibits supplied by participating firms provide a pointer to characteristic modern developments.

Among the exhibits of scientific instruments, research equipment, etc., are the following:—

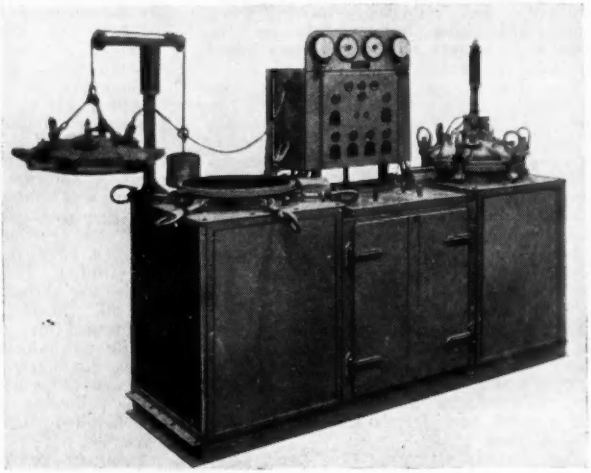
THE ACCURATE RECORDING INSTRUMENT CO., Morden, Surrey. (Stand 1, Row S, Ground Floor, National Hall.)—The display here includes representative examples of the firm's manufactures in dial thermometers, in remote-reading and rigid stem types, temperature indicators and controllers, temperature recorders, tank gauges, vacuum recorders, and other instruments.

BARLOW-WHITNEY, LTD., London. (Stand 8, Row C, Ground Floor, Grand Hall.)—The specialities exhibited by this company cover a wide range of electrically heated plant and apparatus for industrial processes in the chemical and a number of other trades, including vacuum and pressure impregnating plants, hardening and annealing furnaces, and tanks for plastic dip coating processes.

BAYHAM, LTD., London. (Stand 50, Inner Row, Grand Hall Gallery.)—Among the dial type liquid level indicators being shown one of the more interesting features is the magnetic coupling between the operating float gear and indicating pointer. Indicators are available in dial diameters of from 2 in. to 15 in.

THE BRITISH ROTOTHERM CO., LTD., Merton Abbey, London. (Stand 17, Inner Row, Grand Hall Gallery.)—Outstanding characteristics of the dial type thermometers exhibited by this firm are their robustness and the facility with which they can be read. Also shown are temperature gauges applicable to exhaust gas, lubricating oil, etc., and a number of special purpose instruments.

COMMERCIAL X-RAYS, LTD. (Stand 53,



Barlow-Whitney vacuum and pressure impregnating plant. A special feature is that it is completely self-contained and occupies a minimum of floor space

Gamma-ray operating container for radium, radon seed, etc., open during exposure

Gallery.)— Represented here are the activities of two associated companies, both engaged in non-destructive examination of all metals in the form of castings, forgings, welding and welded fabrications. A new facility is the welders' testing service which offers a free test of 12 in.-15 in. specimen welded test pieces up to 2½ in. thick. Now that the Government is making radium and radon seed sources available for industry, Gamma-Rays, Ltd., will advise industrialists on the form and strength of element most suited to their particular application.

THE DEPARTMENT OF SCIENTIFIC AND INDUSTRIAL RESEARCH, London. (Stand 3, Row U, Ground Floor, Empire Hall.)—On this stand are demonstrations by scientists of the latest items of research apparatus being currently used. The exhibit as a whole demonstrates the importance which is attached to research by British industry, and the manner in which the applied scientist is co-operating with the engineer in maintaining industrial efficiency and the quality of British products.

EVERSHED & VIGNOLES, LTD., London. (Stand 6, Row Q, Ground Floor.)—A simple pilot plant has been installed to demonstrate the company's most recent developments in process control apparatus. Instruments for distant indication and control, and electric salinometers are also on view.

THE MORGAN CRUCIBLE CO., LTD., London. (Stand 12, Row E, Ground Floor, Grand Hall.)—The exhibits here include many types of crucibles, a power tilting lip axis pouring crucible furnace and a wide range of "Morganite" carbon engineering components for many industries.

NEGRETTI & ZAMBRA, LTD., London. (Stand 4, Row H, Ground Floor, Grand Hall.)—A comprehensive range of industrial and scientific instruments is shown, including mercury-in-glass and mercury-in-steel thermometers, temperature recorders and controllers, thermo-hygrographs, and liquid level and humidity controllers for a variety of industrial processes. Claimed to be particularly accurate and robust, these instruments are guaranteed for two years.

Chemical Glassware

PILKINGTON BROTHERS, LTD., St. Helens. (Stand 8, Row P, Ground Floor, National Hall.)—This exhibit demonstrates, among other things, the wide scope of glass as a material in industrial and chemical engineering, and includes examples of built-up glass tanks, also platen plate for use with rubber and plastic presses.

SHARPLES CENTRIFUGES, LTD., Stroud, Glos. (Stand 5, Row D, Ground Floor.)—Two types of Sharples laboratory supercentrifuges which have been widely adopted for research and industrial laboratories are among this company's exhibits. The open model is useful for experimental sedimentation, separation and clarification processes. The Presurtite machine, totally enclosed, is designed for the sedimentation of viruses and treatment of toxic materials.

SPIRAX MANUFACTURING CO., LTD. Cheltenham, Glos. (Stand 23, Row GG, First Floor.)—Among its full range of steam trapping, air venting and allied products, particular attention is being given by this firm to Spirax methods of improving heat transfer in steam-heated plant, and the recovery and use of flash steam. Another feature will be the Sarco external temperature operated controller for accelerated hot-water heating systems.

VOKES, LTD., Guildford. (Stand 5, Row E, Ground Floor, Grand Hall.)—Examples are shown of this firm's filters for air, oil, various fuels, air conditioning, compressed air, gases, etc. There is also a fully mechanised working model of the Vokes dust recovery filter unit for the recovery of valuable dusts in industry.

The following are among the exhibits of chemical manufacturers and allied firms:—

ALBRIGHT & WILSON, LTD., London.

(Stand 44, Gallery.)—The stand is divided into two parts, one showing displays of water treatment, and the other some of the many products which incorporate silicone chemicals. The service of sodium phosphates and sodium metaphosphate (Calgon), used in treatment of boiler feed and cooling water to prevent scale formation and corrosion, is also demonstrated. Many versatile silicone products are now commercially available including silastic rubber, which remains serviceable over a wide range of temperatures.

THE CHEMICAL AGE will be represented on STAND 21, Inner Row, National Hall Gallery, where all the industrial publications of Benn Brothers, Ltd., will also be available

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FLETCHER, MILLER, LTD., Hyde, Cheshire. (Stand 7, Row AA, First Floor, Empire Hall.)—This firm is exhibiting examples of metal cutting oils, including soluble types, also Rodol rust preventatives in 18 liquid and solid grades, and the Solvex degreaser and cleaner.

ROZALEX, LTD., London. (Stand 54, Gallery.)—This display shows a full range of preparations which provide protection against industrial irritants capable of causing skin trouble. The Rex dispenser, which ensures controlled distribution and an uncontaminated supply of Rozalex to each person, is also on view.

The following are among the representatives of the chemical engineering and allied industries:—

CROSSLEY BROTHERS, LTD., Manchester. (Stand 4, Row G, Ground Floor.)—A wide range of engines suitable for marine or industrial application is displayed. Numbers of HRL and ERL types have been installed in the heavy chemical and oil industries.

G. A. HARVEY & CO. (LONDON), LTD., London. (Stand 8, Row M, Ground Floor.)—Exhibits cover a wide range of products for petroleum refinery plant for which the company is now the approved manufacturer to the American API/ASME code, enabling it to compete with American concerns for export orders. "Harco" perforated metals suitable for filtering and grading such diverse materials as coal, cereals, food products and chemicals are also shown.

SIGMUND PUMPS, LTD., Gateshead. (Stand 10, Centre Row, National Hall Gallery.)—Here are examples of "Sigma" process pumps from the series of over 80 types now in use in many oil refineries and chemical works.

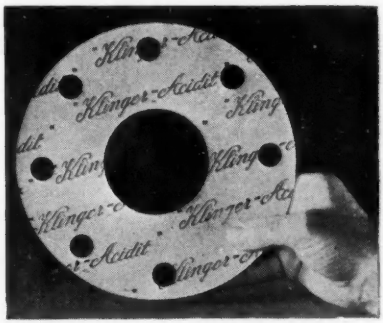
RICHARD KLINGER, LTD., Sidcup, Kent. (Stand 1, Row C, Ground Floor.)—Among the specialities displayed is the "Klinger-Acidit" acid resisting jointing produced to meet the requirements of the chemical and engineering industries engaged in the manufacture, use, storage, and transport of concentrated acids.

THE SAUNDERS VALVE CO., LTD., Cwmbran. (Stand 8, Inner Row, Grand Hall Gallery.)—Shown here is a full range of diaphragm valves for all fluids, from water to the most active acids, and corrosive and abrasive liquids generally. Also shown are representative examples of this firm's Safran centrifugal pumps.

There are several exhibits of plastics interest.

ASHDOWNS, LTD., St. Helens. (Stand 20, Outer Row, Grand Hall Gallery.)—Here are shown plastic mouldings in thermo-setting thermo-plastic materials, extrusions in PVC, synthetic resin bonded paper base mouldings for refrigerators, etc., and synthetic resin bonded boards for electrical insulation and mechanical applications. Also exhibited are examples of silicone bonded glass fabric laminated board for high-temperature electrical insulation.

R. H. WINDSOR, LTD., London. (Stand 10, Row Q, Ground Floor, National Hall.)—The principal interest of this exhibit centres in the several thermoplastic injection moulding machines to be seen at work, from 10 gm. to 16 oz. hand or hydraulic operation, and automatically controlled cycle, for moulding a wide range of thermoplastic materials. There



Acid-resisting jointing by Richard Klinger, Ltd.

are also on view extrusion machines for cellulose acetate, PVC, etc.

In the welding section, the following are representative exhibits:—

MUREX WELDING PROCESSES, LTD., Waltham Cross, Herts. (Stand F11, Ground Floor, Grand Hall.)—Practical demonstrations of new developments are being given, among the exhibits being the latest type of Murex 300/400 amp. Diesel engine-driven equipment fitted with a new cartridge starter. New electrodes will be demonstrated from the firm's wide range, which includes types for the welding of mild steel, high tensile steels, heat resisting steels, non-ferrous metals, cast iron, and for hard facing applications.

PHILIPS ELECTRICAL, LTD. (Stand G16, Ground Floor, Grand Hall.)—A special range of arc welding equipment, magnetic filters, and battery chargers is being displayed by the company's industrial department. An interesting feature is the new Motronic equipment which facilitates automatic control where quick response to changing requirements from electrical motors is necessary, and there is a useful show of X-ray equipment designed for the industrial user.

ROCKWELD, LTD., Croydon. (Stand F14, Ground Floor, Grand Hall.)—This display includes equipment for the fabrication of plastic materials by welding and typical products. The exhibit is in collaboration with The Chemical Pipe & Vessel Co., Ltd., whose range of productions on view includes pipe lines of all bores, tubes up to 36-in. bore, tanks up to 500 gal. capacity, chemical drains, etc., made of polythene.

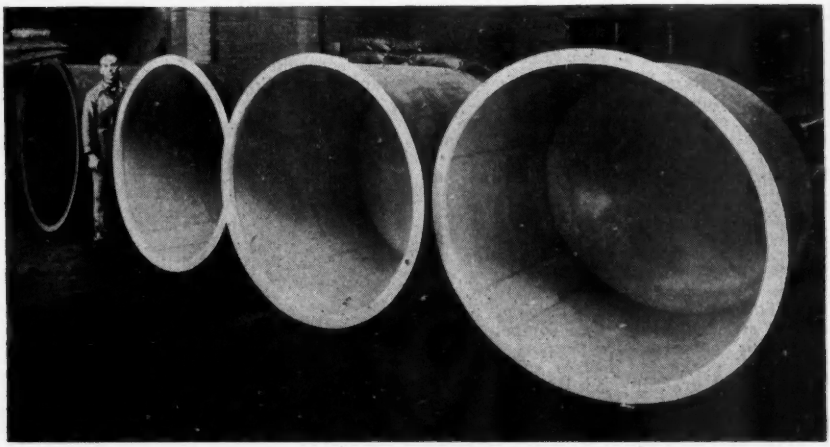
Non-ferrous metals are represented by a number of exhibits, typical among which are:—

ALMIN, LTD., Farnham Royal. (Stand 2, Row R, Ground Floor, National Hall.)—Shown here are many examples of aluminium alloys in ingot, semi- and fully-manufactured forms. The Almin (Associated Light Metal Industries) advisory bureau will answer queries regarding the use and application of aluminium alloys.

THE ALUMINIUM DEVELOPMENT ASSOCIATION, London. (Stand 8, Outer Row, National Hall Gallery.)—Members of the association's technical staff are in attendance and are available for consultation on problems affecting construction, engineering, and the behaviour of aluminium under many conditions.

THE BRITISH ALUMINIUM CO., LTD., London. (Stand 5, Row V, Ground Floor, Empire Hall.)—The application of medium and high strength aluminium alloy plate to large scale and structural engineering projects is emphasised on this stand.

I.C.I., LTD., METALS DIVISION, Birmingham. (Stand 8, Inner Row, National Hall Gallery.)—Here are many examples of sheet, strip, tubes and extrusions in copper and copper base alloys, and aluminium alloys, etc., in a wide range of applications.



Mild steel tanks lined with polythene moulded sheet, each of 500 gal. capacity, made by The Chemical Pipe & Vessel Co., Ltd.

ORGANIC SEQUESTERING AGENTS

Some New Industrial Applications

From A CORRESPONDENT

CERTAIN complex organic compounds, notably ethylene bis-iminodiacetic acid, act as a water-soluble ion-exchange or water softener, and also have the ability of solubilising normally insoluble metallic and rare earth ions to form stable chelate complexes. This action is frequently known as "sequestering" and the chemicals responsible for it are referred to as "sequestering agents."

It is, of course, well known that some of the polyphosphates possess marked sequestering properties, but for certain applications the organic compounds are preferable. For example, unlike the phosphates, the organic sequestering agents form complexes with calcium salts, which can be boiled or stored indefinitely in aqueous solution without breakdown; moreover, the organic calcium complex is stable in aqueous sodium hydroxite at a strength of 10 per cent.

Because of this high stability at elevated temperatures, and in the presence of strong alkalis, ethylene bis-iminodiacetic acid and its salts are now being recommended for use in alkali metal cleaner baths. For this purpose, the polyphosphates, with their limited stability at high temperatures and high alkalinity, are often unsuitable. The organic sequestering agent is not only unaffected under these conditions, but it prevents the precipation of calcium phosphates, silicates and carbonates which will contaminate a metal surface whenever hard water is used.

Chelate Complexes

The ability of ethylene bis-iminodiacetic acid to form stable and soluble chelate complexes with divalent and trivalent metallic ions is of considerable importance; for example, one mol. of the acid (292 gm.) will bind a maximum of one gm. ion of a divalent metal. This peculiar property can be exploited to good purpose in plating operations where metal complexes with the organic acid can often replace the cyanides and offer the advantages of freedom from any health hazard, stability, ease and safety of processing with ordinary tap water, and improved adhesion and brightness of the deposited metal surface.

Considerable research and development work on sequestering agents has been carried out in the U.S.A., and U.S. Patents 2,130,505 and 2,240,957 describe methods of manufacturing polyaminocarboxylic acid derivatives, of which ethylene bis-iminodiacetic acid is the most important. This acid, which is known in the U.S.A. as Sequestrene, is available as a white, free flowing non-hygroscopic powder. It is sparingly soluble in hot or cold water and in the common organic solvents. It dissolves in aqueous solutions of bases to form alkali metal, ammonia and amine salts.

The acid may be converted to the tetrasodium salt merely by dissolving it in an aqueous solution of sodium hydroxide.

The *p*H of a saturated solution of ethylene bis-iminodiacetic acid is 2.8, while the di-, tri-, and tetrasodium salts have *p*H values in 1 per cent solution of 4.8, 8.8, and 10.5 respectively.

Solubility

The solubility of the di-sodium salt is about 3 per cent in water; the neutral and alkaline salts are highly soluble. These salts are insoluble in alcohol, but will dissolve in iso-propanol alcohol containing 10 per cent or more of water.

In addition to these normal salts, the organic sequestering agent forms a series of inner salts or chelate complexes which, unlike most other chelate-forming compounds, are water-soluble substances of high stability. The di-sodium salt of the calcium complex of ethylene bis-iminodiacetic acid is highly soluble in water and insoluble in organic solvents, and when tested it does not give any of the usual analytical tests for calcium. The addition of oxolate, soap, phosphate, hydroxide or carbonate causes no precipitate of calcium. This is clear evidence that the calcium in this salt is not ionised, but is part of a water soluble anion. At neutral and alkaline *p*H values, one part of ethylene-bis-iminodiacetic acid will sequester or bind about 0.12 parts of calcium in the presence of oxalate or soap, but the *p*H is lowered the stability of the organic calcium complex decreases and the calcium is progressively released in its ionised form.

The ability of ethylene bis-iminodiacetic acid to form stable and soluble com-

plexes with metallic ions has already been noted.

One of the most important applications of organic sequestering agents is in textile dyeing, where it is known that the presence of calcium, magnesium, iron, copper, tin and other metals is liable to cause faulty dyeing. Such defects as streaking, spotting, dullness, crocking, poor colour yields and even colour changes have been traced to the presence in the liquors of free metallic ions.

Generally speaking, acid dyes are sensitive to iron and copper. Chrome fast colours, applied after chroming, are sensitive to iron, nickel and lead. Sulphur colours are affected by copper, azoics are duller when dyed in iron vats, and some direct colours for rayons give false tones in the presence of copper. (Grundy, *J. Soc. Dyers and Colorists*, 45; 39; 51; 377.)

Application to Vat Dyes

Acetate colours dyed in a soap bath will show reduced colour yields and spotting if any alkali earth or metallic soaps are deposited on the fibres. This can be prevented by the introduction of ethylene bis-iminodiacetic acid into the bath. Work on vat dyes has shown that the use of an organic sequestrant does reduce crocking. It is now claimed by investigators that organic sequestering agents are suitable for use with all dyes, as it is known that a few colours, such as metallised dyes, *e.g.*, Neolans or Palatine fast dyes, are affected adversely by action of ethylene bis-iminodiacetic acid and salts.

In kier boiling the introduction of the organic sequestrant in the liquor keeps calcium soaps in solution, and this assists materially in producing a whiter and softer fibre. In the preparation of printing pastes with hard water, the use of this additive prevents livering at alkaline *p*H values, and starch finishes and sizes give cleaner and more brilliant results when ethylene bis-iminodiacetic acid or its salts are present.

The use of polyaminocarboxylic acid derivatives for preparing clean metal surfaces is now being appreciated by metal processing concerns with experience of polyphosphates. In the past, these inorganic sequestrants have been somewhat limited in their application due to their stability at high temperatures and high alkalinity. Ethylene bis-iminodiacetic acid and its derivatives will prevent precipitation of calcium phosphates, silicates and carbonates at high alkalinity and high temperatures.

This organic acid also possesses the property of stabilising metasilicate baths, and as little as 0.1 per cent of the sequestrant will prevent metasilicate being thrown out of heated solutions as a colloidal precipitate. In anodising it has been found that ethylene bis-iminodiacetic acid tends to counteract the effect of dissolved metal ions on the dye and enables more brilliant colours to be obtained.

As an alternative to cyanide in metal plating the use of ethylene bis-iminodiacetic acid has been claimed to produce excellent results. It is also worth noting that silver is readily reduced to the metallic form by this acid and deposited as a silver mirror.

By preventing the deposition of insoluble alkali earth and metallic soaps from solutions of fatty acid soaps, the use of the polyaminocarboxylic acid derivatives is of considerable importance in the production of liquid soaps, shampoos, industrial washing compounds, bath oils, bubble baths, lather-type shaving creams, skin cleaners, cuticle removers, etc. For all these applications the organic sequestrant is superior to the polyphosphates, which are unstable in aqueous solutions.

Agricultural Chemicals

Some of the newer agricultural chemicals, such as 2, 4 dichlorphenoxyacetic acid, form insoluble calcium salts on dilution with hard water, with a resultant depression of their biological activity. As 2, 4 D is generally sold as a 20-40 per cent aqueous solution of the amine salt, the addition of polyphosphate is unsatisfactory owing to its limited compatibility and the danger of its hydrolysis and inactivation on storage. The amine salts of ethylene bis-iminodiacetic acid are not only extremely stable and effective water softeners, but they will prevent precipitates of the 2, 4 D in hard water. Hard water solutions of cationic surface active agents show lowered germicidal activities than those made in soft water, and here again the presence of a small quantity of the organic sequestrant prevents precipitation in ordinary tap water. Ethylene bis-iminodiacetic acid is particularly valuable where emulsions have to be prepared with hard water.

In several types of synthesis, the presence of traces of alkali earth and metallic impurities is known to have a retarding effect on the yields, *e.g.*, production of hydrazine from ammonia hypochlorite gives decreased yields in the presence of calcium. It is suggested that where such difficulty is presented consideration might be given to using organic sequestrants.

A NEW LIQUID OXYGEN CONVERTER

Advantages for Industrial and Other Uses

A LIQUID oxygen converter having significant advantages for a variety of uses, including aviation, industrial and medical purposes, has recently been developed by W. A. Wildhack and associates of the U.S. National Bureau of Standards with the co-operation of the U.S. Bureau of Aeronautics, Department of the Navy. The converter is fully automatic, requiring no electric or other source of power. Its compactness and greatly reduced weight are claimed to represent a decided advance over gaseous equipment now used, for example, to supply breathing oxygen in aircraft. Other features include sturdiness, simplicity of design and operation, rapid attainment of operating pressure, economy of oxygen, and delivery of warm gas.

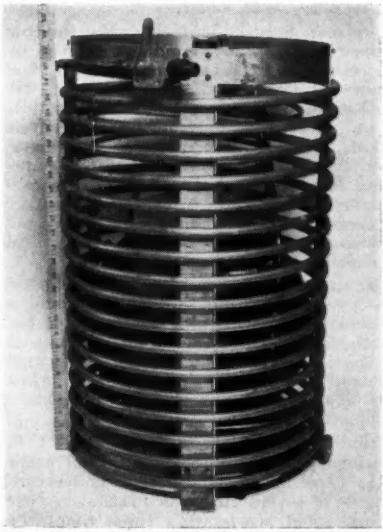
It consists of a standard 25-litre metal Dewar flask modified by the addition of a bottom drain, together with two coils, one for build-up of pressure and one for warming the gas as it is delivered. After it is filled with liquid oxygen, the flask may be sealed off from the atmosphere.

Building Up Pressure

When oxygen gas pressure is to be built up, a valve is opened, allowing liquid to flow through a drain tube and liquid trap at the bottom of the flask and into the build-up coil, where it is evaporated and warmed by the atmosphere. The warm gas rises through the coil by thermal convection until it enters the top of the flask, where it mixes with the gas above the liquid. Here some of the gas condenses on the liquid surface, but the condensed gas is immediately replaced by freshly warmed gas and the cycle continues, the gas pressure rising quickly.

Once pressure is established, gas may be withdrawn by forcing liquid through the bottom drain into the withdrawal coil, where it is evaporated and warmed by the atmosphere as it passes to the outlet mechanism. Excessive rise in pressure is prevented by the closing of an automatic bellows-type valve in the build-up coil, which stops the flow of additional gas to the top of the flask.

At higher pressures, another pressure-actuated valve, the "economiser," vents gas directly from the top of the converter to the delivery coil. When this circuit is open, any withdrawal of gas diminishes the pressure quickly to operating values.



The new liquid oxygen converter, which requires no source of power other than the heat of the atmosphere

Two pressure relief valves are also provided, one in the build-up tube and the other in the delivery line.

The fact that it is not necessary to heat the entire mass of liquid to raise the pressure is claimed to constitute an important difference between this and earlier types of liquid oxygen converters. The rapid decrease in density of the liquid with increasing temperature makes possible a relatively warm surface layer in the liquid, as very little heat is lost from this layer to the rest of the liquid by convection. Thus, the heat transferred to the gas as it passed through the build-up coil is largely retained in the space above the liquid in the container, and a rapid increase in pressure results.

The total converter unit is 25 in. high and 18 in. in diameter. It weighs 60 lb. and holds 62 lb. of oxygen, enough for 10 men for 10 hours. To supply this quantity of oxygen from gas cylinders at 1800 p.s.i. would require 21 tanks of 514 cu. in. each, which would weigh a total of 350 lb.

empty. For flows up to 150 litres per minute (5 cu. ft./min.), gas is delivered at a temperature differing by only about 5°C. from atmospheric temperature. Flow rates over 10 times as great may be obtained, but at these larger flows the delivered gas is colder.

Pressure may be built up, when the container is full, from zero to 65 lb. p.s.i. in 10 sec. The flask is somewhat stronger than the standard Dewar flask and will withstand internal pressures of 200 lb. p.s.i. Pressure, once achieved, is quite stable, and although it drops with vigorous shaking, recovery is almost instaneous. The depth of the liquid in the container is measured by a differential bellows-type manometer connected between the bottom drain and the top of the neck of the Dewar.

To permit the converter to operate in an inverted position, a gravity circuit is provided, consisting of a line from the top of the neck of the Dewar to the bottom of the delivery coil. It contains a gravity-controlled valve which opens only when the apparatus is inverted.

The converter is reported to have successfully withstood tests at the U.S. National Bureau of Standards and other U.S. Government laboratories under conditions of severe vibration (3000 cycles per min.), rapid acceleration (nine times the acceleration of gravity), severe cold (−40°C.), and severe heat (75°C.). Performance at tilts up to 45° was not materially different from that observed in the erect position.

When the apparatus was inverted, pressure rose somewhat rapidly because of the shorter heat path from the atmosphere to the liquid in the neck, but in five-minute runs the pressure rise was not generally sufficient to open the relief valve. Converters built on the National Bureau of Standards design by commercial manufacturers are said to have operated satisfactorily in flight tests carried out by the U.S. Air Force and the Navy at altitudes up to 40,000 feet.

AUSTRALIAN COAL-OIL

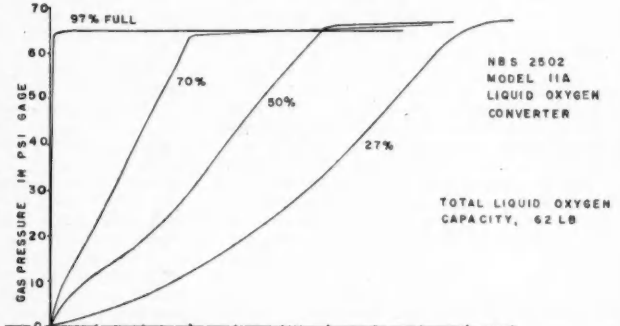
Wide Conversion of Brown Coal

As a result of recent researches by industrial chemists of the Australian Council for Scientific and Industrial Research, the extensive brown coal deposits in the State of Victoria may be used for the production of motor fuels, reports the Australian Government News and Information Bureau. Following recent technical developments, production cost is now approaching that of ordinary petroleum. Research has shown that local brown coal gives better results than German brown coal, to which the production process was largely applied during World War II.

Since Australia has, as yet, no considerable oil flow, the successful experiments hold much promise for the expansion of industry. The procedure now under study in Victoria embodies both the American and German practices, and involves the gasification of "fluidised" finely powdered coal with a mixture of steam and oxygen.

The Latrobe Valley in Victoria, under which are large brown coal deposits, is expected to become one of the largest industrial seams in Australia. More than 27,000 million tons of brown coal are believed to be available. Opencast mining in the area has operated for some years at Yallourn.

Another seam is to be started at Morwell, which is estimated to cover 40 square miles. Four great briquette factories will eventually turn out 650,000 tons of briquettes a year.



Pressure development in the converter when filled to varying percentages of its capacity

DUTCH CHEMICALS AND FIBRES

Improved Manufacturing Facilities

THE Rubber Foundation, of Delft, takes credit for a special method of making transparent hydrochloride rubber almost identical with Pliofilm, and N.V. Stork-Chemie has acquired from it a licence for the manufacture of the new product, called Rulahyd.

* * *

The Royal Dutch Salt Industry, Ltd., of Boekelo, reports that Germany has recently become a big competitor in the European markets for crude salt and that salt prices have shown continuous reductions. The company is proceeding with the implementation of its chemical projects.

* * *

The Chemische Fabriek, Ltd., of Naarden, which already controls five foreign subsidiary companies at Bombay, Buenos Aires, Brussels, Stockholm, and Batavia, has put up another at Oslo, Norway, under the style of "Norsk A/S Naarden." The aromatics industry in Holland appears to be well-booked with foreign orders.

* * *

The liner *Westerdam* has taken to New York the first instalment of quinodine sulphate under the American counterpart funds purchase contract. The shipment amounts to 50,000 ounces and is destined to be used as a heart tonic. Because there is a pressing need for this quinine development the Nederlandsche Kininefabriek, of Maarsden, hastened the processing from cinchona bark, so that the shipment could be made ready some two months ahead of the schedule.

* * *

The Royal Sulphuric Acid Company of Ketjen reports that its factory for manufacturing sulphur dioxide, erected in 1948, has been in continuous working up to now. The installation for the production of permanganate of potash is being enlarged and is expected to be completed within a very short time. While the capacity for producing sulphuric acid has been substantially enlarged since October 1947, the company was not able to export major quantities in 1948 owing to the keen demand for sulphuric acid in the home market. The comparatively new branch of production of dye intermediates and softeners for the plastic industry is proving a success.

The leading Dutch rayon producer, Algemene Kunstzijde Unie, of Arnhem, has developed a fully synthetic fibre which promises to meet all demands of the Dutch public for artificial yarns. Production of carboxymethyl cellulose plastic by this company is also progressing.

* * *

The National Bank for Reconstruction (Nederlandsche Maatschappij voor Financiering van het National Herstel) whose loans to Dutch chemical firms were referred to in THE CHEMICAL AGE, 60, 744, has obtained a loan from the International Bank for Reconstruction. This is with a view to financing the expansion of the State mines of Limburg; the erection of a new factory at Beek; of the N.V. Mij. tot Exploitatie van Kooksovengassen; the N.V. Koninklijk Nederlandse Zout Industrie of Hengelo; the N.V. Fabriek voor Chemische Producten Vondelingenplaat of Vlaardingen; N.V. Franken-Donders United Aniline Works of Tilburg; N.V. Kempensche Zinkmij. (Zinc de la Campine) of Budel. Also, the loan in intended to help finance the putting up of a new factory for making streptomycin by the N.V. Centrale Suiker Mij., of Gorinchen.

The Dutch cement and glass industries are also among the recipients of financial advances.

Australian Wool Wax

ECONOMICAL methods of extracting and refining waxes from sheep's wool and from sugar cane are being investigated in Australia by the Division of Industrial Chemistry, Commonwealth Scientific and Industrial Research Organisation. Derivatives of these two waxes are also being examined for possible commercial use. Quantities of a potential value of many thousands of pounds have hitherto been lost every year. It is considered that between 10,000 and 15,000 tons of wool wax could be extracted from the greasy wool secured annually in Australia. Only a small proportion is now being used commercially. The CSIRO has installed a highly complicated vacuum still to separate the components of the wax.

OFFICE APPLIANCES IN CHEMICAL ORGANISATION

Some Modern Book-keeping and Accounting Machines

by S. HOWARD WITHEY, F.Comm.A.

IN every works and industrial organisation separate activities have to be recorded in one form or another. When business records are made almost wholly by pen-and-ink methods a great deal must depend upon the accuracy of the entries made in the various subsidiary books—the purchases journal, sales book, cash book, etc.—and it is the need for analysing the original entries and for keeping separate accounts that constitutes the drudgery and expense of clerical work.

Mechanical Aids

The same need to maintain a suitable system of internal check and control also prevails when modern office equipment is used, but mechanical aids enable the prime records to be verified at more frequent intervals and ensure that errors are located much quicker than is possible in the case of manual records.

During the past four years the attitude of executives towards labour-saving machinery in the office has changed, and in the chemical industries the majority of successful businesses have made the office the heart of the concern. There mechanical aids are often regarded as essential as up-to-date plant in the works.

It is now being widely recognised that the need for cutting out unproductive work calls for the employment of various forms of mechanical equipment to assist in the attainment of production targets and to cope with modern developments.

Adding and calculating machines perform much routine work of the kind which office workers most dislike and are of two main types. One provides a printed list of the items to be added; the other arrives at the total, the advantage of the former being that it enables the items to be checked back. Where a printed list of amounts is not required the operations can be performed more quickly by using a machine with a greater range and which is useful in determining the cost of each unit of production, and in computing percentages.

The original machines of the Underwood-Elliot-Fischer type were constructed to typewrite in bound books and many firms now use them for making out invoices in conjunction with a bound day book. The typing mechanism may be provided for typing only, for vertical adding and subtraction, or for vertical and horizontal adding and subtracting.

Models employing a flat writing surface are still very popular as they enable forms of awkward shape or size to be entered and removed. Such items as price tickets, cards, labels, and several forms of varying size, shape and thickness can be entered without bending, curling or creasing.

The use of continuous rolls of carbon eliminates the handling of loose carbons, and if it is necessary to fill in items at various points the writing head can be removed direct from point to point without returning and spacing. If copies are not required a number may be inserted at one operation and removed one at a time as complete.

Some Burroughs models are designed to perform a variety of work, and an all-round machine is extremely useful in an office where only one machine can be operated.

For particular classes of work in larger offices other models are more suitable; one type is equipped with a typewriter keyboard of standard pattern that enables a full description to be recorded; another type possesses special keys for abbrevations and rapid posting. One of the latest models posts, proves and journalises in one operation; writes the date, folio and amount at the same time; adds the debits, subtracts the credits and automatically extends the new balances and provides separate totals. Directly the postings have been completed the clerical accuracy is verified and proof obtained that all original items have been posted, that none has been posted more than once and that each amount has been posted to the proper side.

Daily Balancing

On accounting machines the ledgers can be posted and balanced each day, all the carriage movements, additions and subtractions are automatically controlled, debit or credit totals and balances can be produced and printed by depressing one key, and negative balances can be shown in red with a distinguishing symbol. Each posting gives the date in the appropriate column, and the rapid and correct alignment of ledger account, statement, journal, or audit sheet (and other related forms) is ensured

by a special collating front-feed carriage.

Various models of the Ormig type are now used in order and billing routine, production control, and ledger posting, the basic idea being to make the original entry in the form of a master copy. This is done by placing a sheet of hectographic carbon (with the coating upwards) at the back of a sheet of ordinary art paper and then either typing or writing on this master from which all subsidiary copies and records can be produced, thereby eliminating all re-writing and re-typing.

From a process layout master it is possible to obtain all order copies, piecework tickets, progress slips, material requisitions, identification tags, etc., and with the ledger-posting method the original entries are made on a master journal sheet from which they can be transferred mechanically to ledger cards, statements, statistical records, etc. When once the sheet has been checked, posting errors cannot creep in.

Machines marketed by suppliers of office equipment include electric carriage typewriters, statistical machines and cash registers, while billing and credit-posting machines are now being used more extensively.

Summary Sheets

The old type of subsidiary book is now giving way to forms and cards and summary sheets which can be inserted by the operator, so that the details can be carboned. While other bills and ledger cards are being printed the summary sheet can remain in the machine until full, when the totals can be produced at the foot under specific headings. In this way, numerous accounts can be made up at one operation and the total charges suitably summarised.

There are now low-priced portable book-keeping machines which occupy less space than a typewriter and bring within reach the manifold advantages of machine accounting, and also assist larger firms in the control of different works departments.

Most of the models can be operated without special training and the short-cut keyboard is extremely simple. It usually has automatic ciphers and dates and is adapted for the simultaneous depression of several keys. They are widely used in connection with such work as analysis of sales, purchases and expenses, the preparation of wages summaries, the compilation of the personal accounts of customers and suppliers and the posting of stores ledgers.

Business executives are now alive to the fact that the maintenance of the old type of record involves the making of numerous entries under a variety of different headings and, therefore, a considerable amount of unnecessary clerical work. In the matter of raw materials received, for example, as many as twenty distinct entries may be required under such headings as advice note, invoice, inwards number, weight, number or quantity, cost price, etc., and the recording commences directly an order for the supply of raw material is placed. When the advice note comes to hand the details have to be inserted in the appropriate column, including the date and advice number, and the material has to be recorded in its proper stock account.

Unit Cards

By entering all types of information on a unit card, which has been designed for use right through to the compilation of the final figures, all copying can be eliminated, and as there is no point at which mistakes can be made it is possible to avoid tedious checking. Figures which are correct at the start must be correct at all subsequent stages.

Documents of original entry—whether single or in duplicate or triplicate—can be employed in such a way that all related items are quickly classified under their proper headings, and with some systems a pair of tweezers and a needle for sorting is all the machinery required.

But, while any business document can be made into a unit card by the simple process of slotting, unit cards can now be obtained of almost any size, length or depth and can be punched with a series of holes, the number and position of which depend on the headings printed on the card.

Original records used with tabulating equipment often take the form of cards on which all information is reduced to a numerical basis, such as date, employee number, order number, process number, hours of elapsed time, rate of pay, and so on, and a sorting machine can be set to sort the cards on any desired basis. When this has been done the cards of a particular class can be run through a machine which will add them and produce the total amount for a given order number or a given worker.

Filing Systems

Present-day office appliances include filing systems, adding and calculating machines, cash registers, book-keeping and accounting machines, and sorting, statistical and tabulating equipment. In addition, there are numerous devices for protecting cheques, for cheque writing, for sorting and counting coin, and a variety of loose-leaf ledgers, ledger cards, duplicators and time recorders. Instead of attempting to adapt any of these to a particular class of work it is always advisable first to decide upon the objective, otherwise the best results may not be obtained.

AMERICAN CHEMICAL NOTEBOOK

* * * * From OUR NEW YORK CORRESPONDENT

TWO improved types of titanium oxide, the first of what is expected to be a series resulting from the introduction of new processing equipment, are now being manufactured and standardised in the U.S.A. by the American Cyanamid Co., Bound Brook, New Jersey. The first of these Unitane 0.310 (Anatase type), is claimed to be particularly suited for high temperature baking enamels, refrigerator finishes, lacquers and phenolic resin enamels. It is also recommended for use in architectural and industrial finishes where the extraordinarily high hiding of rutile is not required and where the clear bluish tone of Anatase is preferred for its decorative effect. Unitane 0.310 is characterised by low reactivity with most vehicles and produces finishes of excellent gloss and gloss retention. In lithographic inks, it has good resistance to fountain solutions and is useful in printing inks where the Anatase type of titanium dioxide may be preferred to the rutile type. The second of the new types, Unitane OR-342, is a variation of rutile titanium dioxide developed especially for use in enamel finishes and related products. It is said to be particularly adapted to formulæ including more reactive vehicles such as the Maelic modified types and certain highly bodied oleocresinous varnishes. Unitane OR-342, the company says, performs especially well in metal decorative roller coatings where very thin films are laid down and must have the maximum flow to give satisfactory coverage and uniformity. It is reported to be excellent for use in alkyd baking enamels where it maintains high gloss and good colour retention under ageing conditions. Samples of both these types may be had for testing purposes upon written request to the company.

* * *

An improved design in stainless steel open Dewar flasks has just been reported from the U.S.A. Elimination of all interior seams by helium-arc welding is said to provide greater strength and a smooth unobstructed surface, contributing to greater efficiency of these durable vacuum-insulated vessels. These new types are fabricated of 18-8, type 304, stainless steel. The internal wall surfaces are highly polished to a mirror finish for optimum reflection of heat rays. In addition, the flasks feature a newly patented radiation shield, which is also highly polished on both sides. Thus the four super-finished surfaces provide an effective barrier against heat penetration. With a high vacuum of 10^{-4} mm. for insulation, the effectiveness of the flasks in containing liquid air, liquid nitrogen or other extremely cold materials is claimed to be unequalled by any other metal container. A wide range of 26 standard sizes, up to 13 in. by 36 in. inside diameter is stated to be available by the manufacturers Hofman Laboratories, Inc., Newark, N.J.

* * *

Surinam, which already supplies the bulk of the bauxite requirements of the U.S.A. is to have further facilities to assist in transportation and shipment. A transfer station will shortly be completed at Carenage, a small fishing village, west of Port-of-Spain, Trinidad. Conveniently placed near Surinam's bauxite mines, which are located up shallow rivers on which boats cannot carry full loads, the $6 million station is expected to start operations within a few months. It will be equipped to unload 1200 tons of bauxite ore per hour and to load 2000 tons per hour. Figures from the Department of Commerce show that the United States obtained 904,711 long tons of bauxite from both domestic and foreign sources in the first quarter of 1949. Of this total, 460,636 tons came from Surinam, 115,001 tons from Indonesia, and 26,497 tons from British Guiana, while United States production was 302,577 tons.

* * *

Commenting on the use of natural rubber in the construction of roads and highways, Mr. Harvey S. Firestone, Jnr., said that such a development would be an asset to the dollar earnings not only of the British Commonwealth but also of Holland and France. "Consumption of natural rubber," he said, "can be expected to increase further with new uses, but it must be kept in mind that the use of rubber in roads depends upon reasonably low and stable prices. Our laboratory and highway tests, supplemented by extensive Far East and European experiments, indicate that the use of rubber powder in asphalt mixtures greatly improves the durability of black-top highways, and reduces maintenance costs. Such road have been laid in Ohio, Virginia, Minnesota and Texas and are being considered in other States."

Technical Publications

RESEARCH and laboratory work frequently necessitates the use of electrical recorders which can cope with quickly varying quantities providing high-speed temperature recording, or measurements of shock and strain. Such an instrument described in the latest catalogue sheet is the highly responsive Inkwell Grapher (No. 302/4906) of Everett, Edgcumbe & Co., Ltd., London. This company has also developed a special type of super-responsive grapher of the inkless type which measures the duration of a process or operation such as a spot or butt weld by marking on a paper tape the number of cycles of current taken during that particular process.

* * *

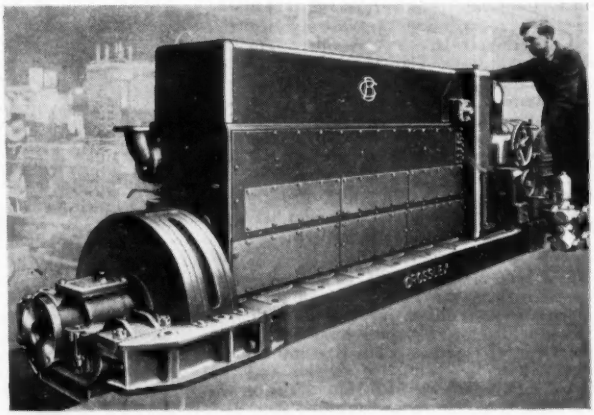
SUBSTANTIAL savings made possible by the use of steel castings in virtually every phase of basic manufacturing operations in the U.S.A. are emphasised in a new illustrated booklet just released by the Steel Founders' Society of America, Cleveland 15, Ohio. The 34-page booklet directs particular attention to the versatility, strength and dependability of steel castings. "The casting of steel," it states, "represents the most direct method of producing steel shapes to final form, while still retaining all the advantages of the basic material. By varying the alloy content of the steel, or the heat treatment of the casting, or both, a wider range of mechanical properties can be obtained in steel castings than in any other castable metal." It discloses that the U.S. commercial steel casting industry increased from 903,869 net tons in 1913 to 2,448,329 net tons in 1943.

* * *

ESTERS of glycerol and many glycols and polyglycols are treated technically in detail in a new brochure issued by the Glyco Products Co., Inc., Brooklyn, N.Y. The materials range from liquids of low freezing points to wax-like solids. Large-scale production has enabled prices to be reduced below pre-war levels.

* * *

WATER Pollution Abatement Manual for insoluble and undissolved substances, is the title of a second booklet on water pollution and its attendant problems just issued by the Manufacturing Chemists' Association, Inc, Washington, D.C. The manual (Sheet W-2), 12 pages, is divided into seven sections, including: Effect on receiving waters; permissible concentrations; removal of solids from waste; sludge digestion; sludge dewatering; sludge disposal; and equipment sources. The Association's first pamphlet on the subject (Manual Sheet W-1), dealt with Organisation and method for investigating wastes in relation to water pollution. Both manuals were prepared by the association's water pollution abatement committee. Additional manuals will be issued from time to time. Copies of the new manual may be had from the association.



Six-cylinder ERL type engine to be shown by Crossley Bros., Ltd., Manchester, at the forthcoming Engineering and Marine Exhibition, Olympia, London. Numbers of this type of engine, differing only in detail from the marine type, have been installed in the heavy chemicals and oil industries

The Chemist's Bookshelf

CHEMICALS, HUMUS AND THE SOIL. Donald P. Hopkins. London: Faber & Faber, Ltd. Pp. 278. 12s. 6d. net.

The author, a chemist, changed from agricultural research work to the agricultural industry proper, and as a result of his contact with farmers, he came to the conclusion that the scientific principles underlying the uses and functions of both manures and fertilisers were often misunderstood. The first part of the book presents the case for the use of fertilisers, and also deals with the general principles of maintenance of soil fertility. The chemical trio, for nitrogen, phosphorus and potassium dominates the ten chapters of Part I. One chapter entitled "Balance Sheets for the Soil," begins with this quotation from Sir Ernest Benn's "Confessions of a Capitalist." "Most estimates certainly most public estimates, contain little more than half the expense that will be incurred in connection with an undertaking, and no man can judge such estimates wisely unless he is able to see not only the beginning but the end of the account." This introduces a study of soil budgets for compost, with the farmer's economic ability to buy fertilisers, and with the production capacity of the fertiliser industry. The seven chapters of the second part examine the case against the use of chemicals. Appendices contain recommendations for various crops, the relation of lime and fertility, and an exhaustive bibliography. The book can be recommended to all who are interested in the fundamental questions of agriculture and also to non-specialist readers.

A CLASS BOOK OF PHYSICAL CHEMISTRY. Lowry and Sugden. Second edition. 1949. London: MacMillan & Co. Pp. 454. 8s. 6d.

The original edition of this work, published in 1929, was intended as a textbook for students reading for examinations of the standard of Higher School Certificate and General Degrees. The present volume does not depart from this scheme and the main modifications are the addition of sections on activity coefficients and colloidal electrolytes, while the nomenclature in the chapter on thermodynamics has been altered. In an elementary book of this nature no discussion is included of spectroscopy and atomic structure, nor of the determination of the structure of molecules by means of X-rays and similar methods, since these topics are considered more suitable for physical and inorganic textbooks. The material is clearly presented and this new edition will continue to serve as a useful introduction to physical chemistry.

Metalworking Manual

BRINGING to a close a seven-year, $300,000 project in which more than 250 production engineers representing leading plants in American industry have collaborated, the first comprehensive collection of technical knowledge of metalworking production has been gathered together in an indexed manual, printed and ready for use. The project was undertaken under the sponsorship of the American Society of Tool Engineers, Detroit. This American professional society, which now has more than 18,000 members, most of whom use such technical data in their everyday occupations as production engineers, invested more than $150,000 in preparation of the text, and a similar amount was spent by the McGraw-Hill Book Company, New York. Actual production costs exceeded $250,000. There are more than 2,000 illustrations in the handbook, which was edited by Frank W. Wilson. The following subjects are included among 2300 in the basic reference manual: (1) planning and control of industrial production; (2) materials and machinability; (3) casting and extruding operations; (4) metal cutting, grinding and finishing; (5) metal forming; (6) welding, glueing and mechanical joining of materials; (7) surface finishing and protective coatings, peening and balancing; (8) gauging, inspection and testing; (9) fixture, die and tool design, limited production and master tooling; (10) machine tool controls and feeding devices.

HOME

Pharmaceutical Conference

There are 22 papers listed to be read in the science sessions of the 86th meeting of the British Pharmaceutical Conference which will be opened at Blackpool on Monday, September 12.

P.O. Metals Economy

A saving of 1850 tons of lead and 1900 tons of copper per 100 miles is claimed by the Post Office by using the coaxial cable for telephone communications over long distances. The cable is capable of carrying 600 simultaneous conversations.

New Plastics Products

De La Rue Extrusions are now marketing new rigid plastic rods and tubes for uses such as electrical conduits, kicking boards and food process tubing. They have applications also in building, furniture manufacturing, electrical and mechanical engineering.

Coal Output

Following the August Bank Holiday break, the total coal production in Britain last week was 1,381,100 tons more than in the previous week and 150,900 tons above the corresponding period last year. Comparative figures are: Last week, 3,947,800 tons (3,700,300 deep-mined, 274,500 opencast); previous week, 2,566,700 tons (2,397,300 deep-mined, 169,400 opencast).

Melamine Resin Patents

An announcement by Aero Research, Ltd., Duxford, Cambridge, states that Resin 286, produced by this company, is manufactured in accordance with the American Cyanamid Company's British patents BP 623335 and 622905 by agreement with the American Cyanamid Company and Ciba, Ltd. Any firm buying Resin 286 has full rights to use it for making wet strength paper according to these patents.

Attempts to Cause Rain

An endeavour to break the recent drought on Tees-side was made last week when experiments to cause rain were carried out by the RAF in co-operation with Imperial Chemical Industries, Ltd., Billingham, and the Meteorological Office. Three flights were made when Drikold, a form of solid carbon dioxide prepared by I.C.I., was " seeded " into suitable cloud formations. Rain was observed on the first two occasions, but on the third attempt clouds became unsuitable by the time the aircraft was airborne.

July Exports Down

The provisional total figure for exports in July is £141.5 million, £1.7 million less than in June and £9.9 million less than in May. Imports amounted to £186.5 million (provisional figure), £15.2 million below the June record, and, except for February, the lowest this year.

Cement Exports Record

A record output of cement was achieved by the Associated Portland Cement Manufacturers in the first seven months of this year, 818,000 tons being sent abroad out of the 3.7 million tons produced up to the end of July. An intensified publicity campaign against nationalisation of the industry is being carried out by the group.

Textile Examinations

Candidates for this year's examinations for National Certificates in Textiles are more numerous than in any year since the scheme was inaugurated by the Textile Institute and Ministry of Education in 1935. Total entries were 298—94 higher, and 204 for ordinary, certificates—from 17 technical colleges and schools.

Packaging Developments on View

The 1st National Packaging Exhibition sponsored by the Institute of Packaging will be held in Manchester from October 3 to 15. The exhibition, which will be opened by Sir Robert Sinclair, president of the Federation of British Industries, will give a comprehensive picture of packaging materials and methods.

Bravery Recognised

A doctor, colliery under-manager, and four miners from Cambois Colliery, near Blyth, Northumberland, who risked their lives to resuce a miner following a fall of roof, have received the King's commendations for bravery. One, Isaac Squires, a coal miner, received the British Empire Medal.

Crop Fibres for Roads

A system which makes use of waste tropical crop fibres for roadmaking has been developed by the A.S.P. Chemical Company. The fibres, when treated and mixed with soil, are said to make a surface which is unaffected by water and capable of bearing heavy loads The Road Research Laboratory of the DSIR has co-operated in the experiments, and the ersultant product, " Pectosal," is intended mainly for development areas overseas.

· PERSONAL ·

MR. J. G. BALL, who has served the British Welding Research Association eight years and was largely responsible for the establishment of its metallurgical laboratories, has left to accept an appointment as a principal scientific officer of the Ministry of Supply, at the Atomic Energy Research Station, Harwell. MR. A. BARKER, who has been secretary of the association since 1946, is leaving at the end of this month to become assistant director of the Federation of Boot and Shoe Manufacturers. Newly recruited members of the technical liaison staff are MR. R. G. BURT and MR. C. C. BATES.

SIR CYRIL ENTWISTLE, M.C., whose election to the board of Coalite and Chemical Products, Ltd., is announced, has risen to eminence in three spheres of public life. After distinguished service in the first World War, he entered Parliament in 1918, and was called to the Bar in the following year, later to become a K.C. He is best known in political circles for his work as chairman of standing committees, and temporary chairman of the House. Coalite and Chemical Products will have the benefit of his experience as a director of seven companies, and chairman of another seven.

The following appointments are included in those which have been made in connection with the founding of the New South Wales University of Technology. *Chair of Chemical Engineering*: DR. J. P. BAXTER, who was appointed director of the General Chemicals Division of Imperial Chemical Industries, Ltd., in 1945. He has been connected with the development of many new chemical products, such as polyvinylchloride, Gammexane, and organic fluorine compounds and also a comprehensive programme of research into chemical engineering problems. The doctor was awarded the O.B.E. for his work on atomic energy with the American team at Oak Ridge during the war. *Chair of Applied Chemistry*: DR. A. E. ALEXANDER, at present assistant director of research, Department of Colloid Science, Cambridge. He was Tilden lecturer of the Chemical Society in 1947. The doctor has been adviser to a number of industrial undertakings in connection with paints, emulsions, soaps and detergents, and is author of several publications on colloids, surface chemistry and polymers. His recent work has been concerned with the effect of the surface activity of substances on their microbiological and drug action.

PROF. HERMANN STIEVE, who enjoys world distinction as an anatomist, has announced his decision to resign from the Humboldt University, in the Eastern zone of Germany, on October 1, unless he is permitted freedom in research. He has been forbidden to publish any of his findings.

The election of two new Fellows and 33 Associates has been announced by the Textile Institute. Elected to the Fellowship are MR. E. COTTERILL, of Braintree, Essex, textile consultant to Courtaulds, Ltd., and MR. E. R. KASWELL, of Waban, Massachusetts, U.S.A.

MR. T. M. HERBERT has been appointed director of research by the Railway Executive, British Railways. Mr. Herbert, who was educated at Marlborough and King's College, Cambridge, was appointed research manager of the LMS in 1932. He is a member of the councils of various metal research associations.

Obituary

THE death was announced last week of MR. W. H. FRENCH, secretary and director of T. & C. Clark & Co., Ltd., Wolverhampton, manufacturers of acid-resisting enamelled chemical plant.

DR. FRITZ J. HANSGIRG, well-known Austrian-born metallurgist, chemical engineer, and inventor of the Hansgirg carbothermic method of processing magnesium, has died in New York at the age of 58. At the time of his death Dr. Hansgirg was chief chemical engineer of the Electro Metal Corporation and the Bach Corporation, industrial chemists.

MR. JOHN STEWART MACARTHUR, who has died at Pollokshields, Glasgow, was for many years managing director of Blacklock & Macarthur, Ltd., paint manufacturers, Glasgow, Cardiff, and London, until the business was acquired by I.C.I., Ltd. He was 73.

• OVERSEAS •

Neutron Radiation Blamed

Eye cataracts are an occupational disease of atomic scientists, affirm the trustees of the University of Illinois, U.S.A. They decided that neutron radiation from the university's cyclotron caused cataracts over both eyes of Dr. Lloyd Smith, a former university scientist. He will receive compensation.

Uranium and Radioactive Ores

What is reported to be the richest deposit of uranium known in Australia is stated to have been discovered 86 miles from Marble Bar. Mr. W. D. Millar, the Queensland expert, who makes this claim, has applied to the Mines Department at Perth for permission to prospect for radioactive ores near Wodonga, where large deposits of tantalite have been mined.

I.G. Farben Unit for Sale

The first unit of the former I.G. Farben combine to be sold to private purchasers will be Kalle & Company, A.G., of Wiesbaden-Bierbrich, according to an announcement made by the U.S. Military Government. Eventually, all 50 of the now-independent economic units which formerly comprised the I.G. Farben properties in the U.S. zone will be put up for sale.

African Tung Oil Plan

The Colonial Development Corporation is to take over the work commenced by the Nyasaland Government to clear and plant with tung an area of some 20,000 acres in the Vipya Highlands of the Northern Provinces. Three oil expressing plants will be set up and the scheme, when fully developed, is expected to yield 5000 tons of oil yearly. The whole area should be in production by 1960 and maximum yield should be reached in 1965.

New U.S. $12 million Steel Plant

Immediate construction of a new $12 million plant, capable of producing 400,000 tons of steel ingots annually, has been authorised by the board of directors of the Armco Steel Corporation, Mr. Charles R. Hook, the chairman, announced. The plant, which will be built to the south of the corporation's main works at Middletown, Ohio, will include three 225-ton open-hearth furnaces of the latest design, and it is expected to give employment to over 500.

Argentine Iron Ore

A technical commission has begun exploration of the Argentine iron-ore deposits near Sierra Grande in the territory of Rio Negro. The deposits are stated to be both extensive and rich, and are very conveniently situated, only some 35 kilometres from the coast, between Antonio Oeste and Puerto Madryn.

Norway's Magnesium Plant

Construction is about to begin on a magnesium oxide plant at Norway's Heroya Kjemiske Fabriek. Construction will occupy 18 months to two years. The factory will produce oxide for use in fire brick and insulation material. Later, following completion of the project's seconding building period, the oxide will be processed into magnesium metal.

Turkish International Fair

At the Izmir (Turkey) International Fair, to be held from August 20 to September 20, inclusive, there is to be a British pavilion organised by the British Chamber of Commerce of Turkey, Inc., from whom full information can be obtained on application to P.O. Box 1190, Istanbul. On the stands of some 40 distributors and agents the products of more than 100 leading British manufacturers will be displayed.

American Engineers in Canada

The American Institute of Chemical Engineers will hold a regional conference in Montreal during September 6-9. This will be the first meeting of the organisation held in Canada since 1937. The programme has been designed to be of the widest interest to engineers in the chemical and process industries and will pay particular attention to the utilisation of Canadian natural resources and the aluminium industry.

Rising Request for Felspar

The Saint-Paul-de-Fenouillet region, France's largest producer of felspar, is reflecting heightened activity as a result of the increased use of its mineral output as basic raw material for various industries. In 1948 production was over 30,000 tons. St. Paul-de-Fenouillet can treat monthly 1000 to 1200 tons, producing material almost entirely free from iron and with low alkali content. The visible seams are estimated to contain about 1 million tons.

U.S. COAL WEALTH

More Than Half World Resources

U.S. BUREAU of Mines statistics indicate that coal and lignite comprise 98.8 per cent of the country's mineral fuel energy reserves, excluding atomic-power elements. Petroleum constitutes .2 per cent, natural gas, .2 per cent, and oil shale, .8 per cent.

Sub-bituminous and lignite deposits exist in enormous quantities in the Dakotas-Montana-Wyoming region, and it is toward these that the oil companies are taking a contemplative look, states an article by Mr. Julian E. Tobey, chairman of the technical advisory board of (U.S.) Bituminous Coal Research, Inc., in *The Rotarian* (Chicago).

Bituminous coal is widely distributed geographically. The Appalachian district is one of the world's great coal-bearing regions. Illinois, Indiana, and western Kentucky are also great fields.

World Reserves

A fairly accurate estimate of the world's known coal reserves is something like 7.5 million metric tons. The American hemisphere has more than half the world's known coal reserves. Europe has about 11 per cent, Asia over 29 per cent, and the remainder is deposited over Africa and Oceania. China also is believed to have a great coal potential.

Should underground combustion not prove feasible, all the more importance attaches to the mechanised efficiency of bituminous mining, states Mr. Tobey. This supports the highest wage structure of any major industry on which the U.S. Bureau of Labour Statistics collects earnings data, with thousands of coal miners earning $400, $500, and some even $600 a month. The industry productivity per man-day has been stated to be five times that of the British coal miner in underground operation.

In 1947 the U.S.A. achieved a record bituminous output of 620 million net tons, or 43 per cent of the world total, while exporting overseas a record total of 48 million tons of solid fuel (including anthracite, coke), largely to Europe. Its productive capacity is about 700 million tons a year, so that when synthetic liquid fuels become commercial, the bituminous industry must take on a great new potential demand. It is known that lower ranks and grades of coal are satisfactory for the making of synthetic motor fuel.

U.S. LIQUID FUELS

Large Additional Coal Needs

AFTER the U.S. Government's programme of converting coal into liquid fuels gets under way, additional coal needs will range from 190 million to 210 million tons per year, according to the American trade journal, *Coal Age*. The magazine says that up to 65 per cent of the raw coal needed to make one million barrels of oil daily will come from untapped coal lands lying west of the Mississippi River, and the remainder from the East.

"Assuming a total need of 575,000 tons per day," says the magazine, "this would mean about 200,000 tons from the East and 375,000 tons from the west. With increased efficiency and more operating days per year, eastern producers could probably mine the required tonnage without adding much to man power and without opening new mines. In the west, however, more miners would be needed and new mines would have to be opened. Overall man power needs for a full-scale coal-to-oil industry are estimated at 160,000 workers, 50,000 of whom would be coal miners."

The location of coal-to-oil plants will depend largely upon the availability of coal. A 20-year plant life, about the shortest that can be considered, would call for a daily mining capacity of 6000 tons of bituminous, 7300 tons of sub-butiminius, or 9200 tons of lignite to make 10.000 barrels per day. Other factors affecting the location of plants will include a good water supply, nearby markets, good transportation, adequate labour supply, and the existence of ready-built facilities, such as mines, housing, chemical plants, pipelines and coke plants, states *Coal Age*.

New Phosphate Fertiliser

COMMERCIAL production is in progress in the U.S.A. of fused phosphate fertiliser, a calcium magnesium phosphate from olivine-phosphate rock fusion, especially suitable for use on magnesium-deficient soils. Full-scale operations started in the Seattle Plant of Manganese Products, Inc., in 1948, when the initial capacity was about 50 tons of fused phosphate fertiliser in 24 hours. Plans have now been made to expand production to about 150,000 tons annually through the installation of a second and larger furnace.

An important characteristic of the new fertiliser is that it does not rot bags of any type.

Law and Company News

Commercial Intelligence

The following are taken from the printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described herein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

CHROMOCINE, LTD., (formerly CHEMICAL DEVELOPMENT CO., LTD.), (M., 20/8/49.) London, W., chemical manufacturers. July 12, £2000 mortgage, to S. E. J. Brice, Staines; charged on 156 to 168 (even) Kensal Road, Paddington. *£4000. December 4, 1947.

EAST RIDING CHEMICAL CO., LTD., Hull. (M., 20/8/49.) July 15, £2500 (not ex.) charge, to Lloyds Bank, Ltd.; charged on land with factory, etc., thereon at Ryde Avenue, Hull. *Nil. February 14, 1949.

PH-ENTEX PRODUCTS, LTD. (M., 20/8/49). Slough, manufacturers of detergents, etc. July 7, mortgage and charge, to Midland Bank, Ltd., securing all moneys due or to become due to the Bank; charged on factory 518 Ipswich Road and factory corner of Montrose Avenue and Edinburgh Avenue, both Trading Estate, Slough, with machinery, fixtures, etc., and a general charge. *Nil. July 31. 1948.

Satisfaction

BRITISH CELANESE, LTD. (M.S., 20/8/49.) London, W. Satisfaction July 19, of debenture stock registered September 24, 1946, to the extent of £10,350.

Company News

Edgar Allen & Co., Ltd.

The chairman reported a strong financial position, with total assets at £1,943,225. Profits, before depreciation, were £483,600 for the year, as a result of a turnover 11 per cent higher than in the previous year. A cash bonus of 5 per cent is to be added this year to the customary dividend of 12½ per cent.

Beecham Group, Ltd.

Profit for year ending March 31, 1949, £1,816,843, as compared with £2,370,181 the previous year. The directors recommend that £425,082 be carried forward. Owing to disappearance of the sellers' market, burden of taxation (11s. 1d. out of every £1 earned), and continuing rise in costs, no payment of final dividend on deferred shares recommended.

Beecham Maclean Holdings, Ltd.

Net profits, 11th annual report for year ended March 31, 1949, £284,322 (£182,764). Dividend on 4 per cent redeemable preference £34,028 (£34,295). Ordinary £231,000 (£129,250). Export and overseas sales increased by over 27 per cent.

George Cohen Sons & Co., Ltd.

Net profit, after taxation, including dividends from subsidiary companies, is announced as amounting to £209,771, for the year ended March 31, 1949. This compares with the previous year's net profit of £333,917. The distribution is recommended of a final dividend of 12 per cent, less tax, on the £600,000 of ordinary stock, making 20 per cent for the year.

Eno Proprietaries, Ltd.

Fifteenth annual report for year ending March 31, 1949. Net profits £302,203 (£282,881). Dividend on 5½ per cent preference £30,250 (same); on 5 per cent "A" preference £21,256 (£5314); on ordinary £245,668 (£188,939).

Macleans, Ltd.

Net profits shown in 14th annual report for year ending March 31, 1949, were £214,161 compared with £144,165 the previous year. Profits from home trade showed an increase of £19,000. Dividend on 4 per cent redeemable preference £14,124 (£14,262), on ordinary £165,000 (£99,000).

Marchon Products, Ltd.

Additional finance to the extent of £250,000 has been acquired by Marchon Products, Ltd., by arrangement with the Industrial and Commercial Finance Corporation. Directors and shareholders have subscribed a further £50,000. The transactions are to be covered by a debenture trust deed of £300,000. Nominal capital will be increased to £100,000 and bonus shares issued privately to the extent of £98,000.

Prichard & Constance (Manufacturing), Ltd.

Net profits for year ending March 31, 1949, £39.826 (£8466). Dividend on 8 per cent preferred ordinary £4400 (same); deferred ordinary (1s. 8d. per share) £34,375 (£2750).

The Stock and Chemical Markets

THE sharp rally in British Funds, which on Monday caused a rebound of up to 45s. in prices of long-dated stocks, helped sentiment in markets, and although business generally was on a limited scale, leading industrial shares improved with gains of up to 1s.

Once again, shares of chemical and kindred companies have taken their cue from the prevailing trend of markets. Imperial Chemical, which fell back to close on 41s. have rallied to 42s. At the time of writing, Turner & Newall recovered to 74s. 4½d., Dunlop's to 61s. and Courtaulds to 33s. 9d. Elsewhere, Fisons were 44s. after 43s. 6d., Laporte 5s. units again changed hands around 21s., Albright & Wilson were around 28s., with Brotherton 10s. shares at 20s., Amber Chemical 2s. shares 4s. 4½d., while Bowmans Chemicals were 7s.

In other directions, Boake Roberts were 29s. and Monsanto at 49s. 4½d. regained part of an earlier small decline. Glaxo Laboratories have strengthened to £18½, and elsewhere, British Aluminium at 43s. 3d. responded slightly to the higher price of aluminium. Lever and Lever N.V. were both firmer at 42s. 6d. and 44s. 3d. respectively.

Firmness was also shown by British Glues at 18s. 6d., although the company's participating preference shares at 35s. were again lower on balance. Triplex Glas, however, at 19s. 9d. turned easier, awaiting the financial results, but Ilford at 22s. 6d. strengthened again and British Oxygen at 93s. were firmer. Associated Cement recovered to 73s. 3d., British Plaster Board to 20s. 9d., while among paint shares, International Paint were 14s. 6d. "ex" the share bonus, although Pinchin Johnson receded to 34s. 6d. following market reports that a big new issue may be contemplated.

Goodlass Wall recovered to 29s. 9d. Borax Consolidated at 50s. 9d. were more active among shares of companies with important interests in the United States. Coalite & Chemical 2s. shares firmed up to 2s. 4½d. and Beechams deferred improved to 12s. 6d. following the chairman's annual statement which emphasised the diversified and widespread nature of the company's business. United Molasses were better at 38s.

Iron and steels remained steady with Dorman Long at 28s. 6d. and Stewarts & Lloyds 52s. 10½d., but United Steel eased to 25s. 10½d.

Boots Drug were firmer at 48s. 6d., with Sangers 28s. 3d., but in other directions, General Refractories eased to 22s. 6d. Oil shares failed to hold earlier gains, the reference in the Canadian Eagle report to the effect of lower oil prices on the current year's earnings affecting sentiment. Canadian Eagle shares receded to 28s., Trinidad Leaseholds to 23s. 9d., while Shell at 68s. 1½d. also lost part of earlier gains. Anglo-Iranian at 7⅜ were lower earlier in the week following the developments in Syria.

Market Reports

UNCHANGED conditions characterise most sections of the industrial chemicals market and, with two exceptions, no major price alterations have been reported. The price of dry white lead has been increased by £2 per ton and is now quoted at £115 10s. per ton. The new price for red lead is £105 10s. per ton. Borax Consolidated, Ltd., have advised a reduction in their prices for granular commercial borax and anhydrous borax. The former is now £27 per ton and the latter £46 per ton for 1-ton lots and upwards in bags delivered. The coal tar products market continues quiet with no special feature to record.

MANCHESTER.—With rather fewer industrial establishments closed down for the annual holidays seasonal influences have continued to be less in evidence on the Manchester chemical market during the past week. A fair amount of new inquiry has been reported for soda ash and other alkali products and actual bookings have affected a rather wide range of other industrial chemicals. Price changes on balance for the week have been relatively few in number. Buying interest in the fertiliser materials has been less quiet and a fair amount of forward business in a number of sections has been reported. Most of the tar products have continued on the slow side.

GLASGOW.—Conditions have gradually been returning to normal in the Scottish chemical market after the holidays. The turnover during the past week has been back to the level of early July. However, there have been no particular demands, and in general supplies are readily available. The only notable exception is potassium nitrate where the delivery is still about three months.

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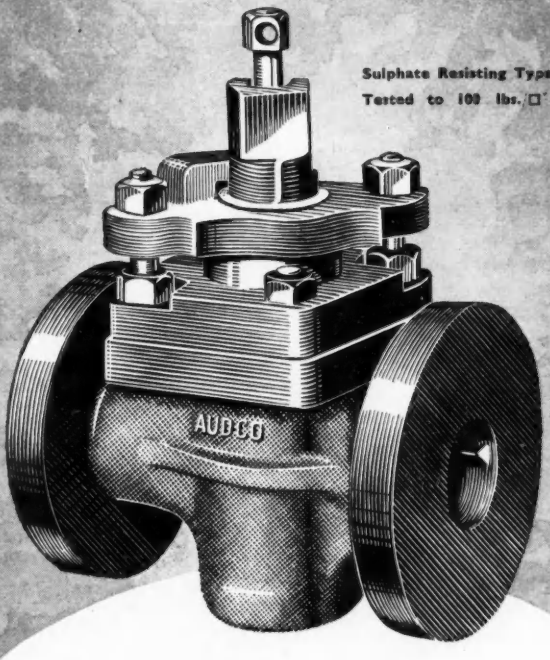

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Patent Processes in the Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of specifications accepted will be obtainable, as soon as printing arrangements permit, from the Patents Office, Southampton Buildings, London, W.C.2, at 2s. each Higher priced photostat copies are generally available.

Complete Specifications Accepted

Hydrofining of hydrocarbon oils.—Anglo-Iranian Oil Co., Ltd., F. W. B. Porter, and J. W. Hyde. Oct. 10, 1946. 624,447.

Methods of coating surfaces with boron.—G. R. Martin. Jan. 15, 1946. 624,523.

Process for dyeing fibrous materials which possess no affinity for dyestuffs.—Ciba, Ltd. Nov. 2, 1945. 624,453.

Manufacture of a condensation product of sulphathiazole.—Ciba, Ltd. Nov. 29, 1945. 624,380.

Process for the manufacture of thioglycolic acid or its salts.—G. Carpeni, and P. Souchay. Jan. 24, 1946. 624,568.

Viscosimeters and plant incorporating such apparatus.—F. L. Smidth & Co., A/S. Dec. 30, 1941. 624,468.

2.8 - Dihydroxynaphthalene-6-sulphonic acid as the azo coupling component for diazotype prints.—General Aniline & Film Corporation. March 20, 1946. 624,472.

Process for the manufacture of piperidophenanthrene derivatives and salts thereof.—J. G. Fife. (Hoffman-La Roche & Co., A.G., F.). Feb. 20, 1947. 624,391.

Treatment of molten meals and molten alloys.—Foundry Services, Ltd., and K. Strauss. March 6, 1947. 624,479.

Electrolytic cells.—I.C.I., Ltd. March 11, 1946. 624,482.

Compositions comprising vinyl chloride polymers or interpolymers.—I.C.I., Ltd., K. W. Small, and P. A. Small. March 28, 1947. 624,393.

Process for the manufacture of folic acid.—Roche Products, Ltd. (Hoffman-La Roche & Co., A.G., F.). April 23, 1947. 624,394.

Method of desulphurising metals.—Soc. Anon. des Hauts-Fourneaux de la Chiers. Feb. 7, 1947. 624,539.

Production of thermoplastic elastomers of polyvinyl chloride.—Boothby & Thompson, Ltd., S. Szekely, and C. A. Redfarn. June 17, 1947. 624,225.

Dyestuffs.—I.C.I., Ltd., W. F. Beech, and M. Mendoza. June 20, 1947. 624,247.

Method of and means for automatically sealing fuel tanks and like liquid containers against leakage due to puncture.—R. Pickles, and J. Pickles. June 26, 1947. 624,283.

Spraying device.—Pest Control, Ltd., A. K. Dorman, and R. C. Clarke. June 30, 1947. 624,300.

Process for the manufacture of organosilicon compounds.—Dow Corning Corporation, and J. T. Goodwin, jun. July 1, 1947. 624,550, 624,551.

Alloy steels.—B. D. Saklatwalla. March 17, 1944. 625,964.

Quantitative analysis of gaseous mixtures.—I.C.I., Ltd., and W. J. Clark. Oct. 11, 1944. 625,886.

Conversion of cyanamide or dicyandiamide to other compounds.—American Cyanamid Co. April 29, 1943. 625,890.

Process of oxidising primary or secondary alcoholic hydroxyl groups and aldehyde groups.—L. V. Farkas, and O. Schachter. Oct. 1, 1944. 626,048.

Manufacture of porous rubber products.—I. A. Ionides. (T. A. Te Grotenhuis). Dec. 6, 1945. 626,050.

Basic alkyl esters and method of preparing the same.—Sterling Drug, Inc. Feb. 2, 1945. 625,811.

Interpolymers of α-halocrylic compounds and polychloro-styrene.—General Aniline & Film Corporation. May 24, 1945. 626,054.

Method for the purifying by electrostatic precipitation of halogens, more particularly of chlorine, when produced by electrolytical processes.—Krebs & Co. Kommanditges. Jan. 7, 1946. 626,059.

Process of preparing amino substituted 2-alkyloxy-or 2-aryloxy-5-aminopyridine. Pyridium Corporation. June 29 1945. 626,062.

Manufacture of polyhydroxy compounds.—E. I. Du Pont de Nemours & Co., W. F. Gresham, and R. E. Brooks. Aug. 14, 1946. 625,909.

Process for the catalytic synthesis of hydrocarbons.—C. Arnold. (Standard Oil Development Co.). Aug. 23, 1946. 626,069.

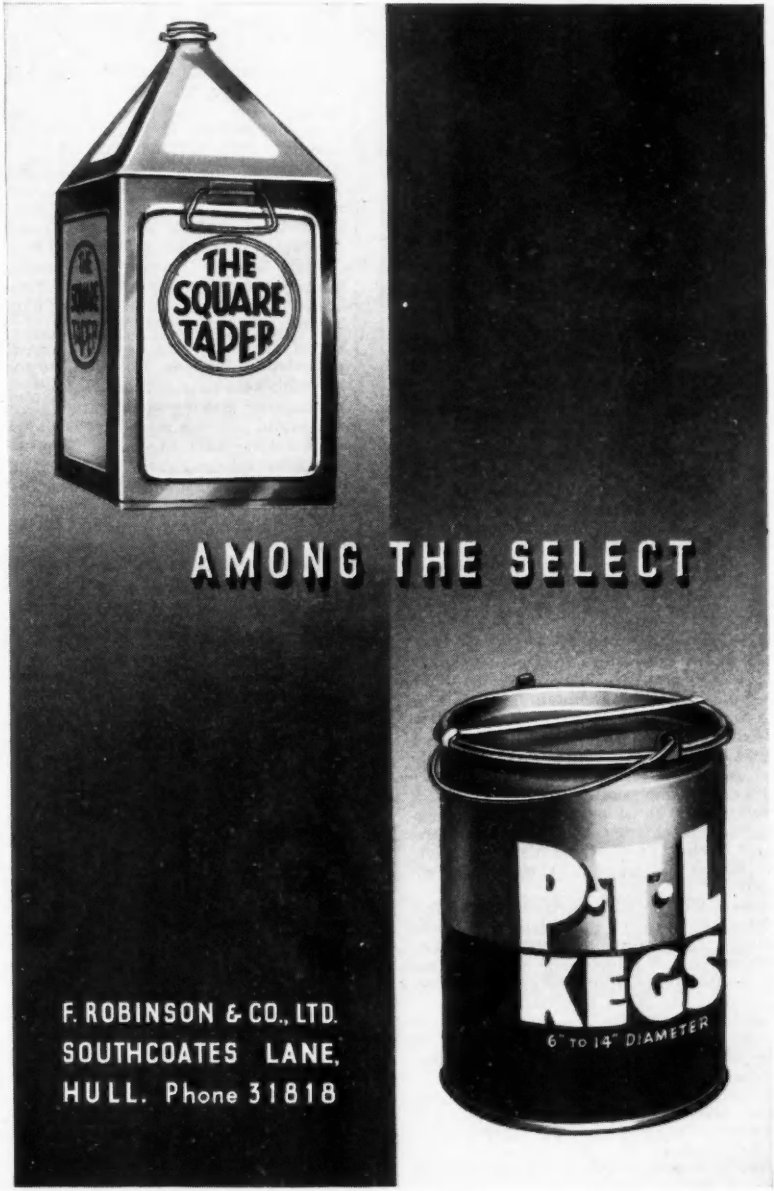
Method of temperature control in chemical reactions employing powdered catalytic material.—J. C. Arnold. (Standard Oil Development Co.). Aug. 23, 1946. 626,070.

Catalyst and process for synthesising organic compounds.—Universal Oil Products Co. May 31, 1939. 626,071.

Manufacture of organic nitrogen compounds.—Ciba, Ltd. Oct. 26, 1945. 625,840.

Process for the catalytic manufacture of hydrocarbons and oxygenated hydrocarbons.—C. Arnold. (Standard Oil Development Co.). Oct. 2, 1946. 625,841.

Derivatives of 2-amino pyrimidine and its nuclear substitution products and processes for producing the same.—Pyridium Corporation. April 8, 1946. 625,931.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Anode protection in electrolytic cells for the production of aluminium.—Det Norske A/S for Elektrokemisk Industri. Feb. 23, 1942. 625,861.

Manufacture of granular phosphatic fertilisers.—Sturtevant Engineering Co., Ltd., H. Richardson & Co. (York), Ltd., J. T. Proctor, and A. Ogilvie. Jan. 7, 1947. 625,863.

Synthetic resins.—Westinghouse Electric International Co. March 27, 1946. 626,145.

Resin bonded cellulosic fibrous materials particularly cords.—Wingfoot Corporation. July 31, 1946. 625,937.

Making of rubber-carbon black mixtures. —C. M. Blow. Feb. 4, 1947. 625,872.

Manufacture of phenols—Distillers Co., Ltd., B. V. Aller, R. H. Hall, D. C. Quin, and K. H. W. Turck. Feb. 13, 1947. 626,095.

Paradichlorobenzene.—Koppers Co., Inc. July 24, 1946. 625,940.

Method for producing spherical metallic granules.—Soc. Miniere et Metallurgique de Penarroya, and A. Falque. March 12, 1946. 625,941.

Polymerisable materials and polymers thereof.—I.C.I., Ltd., and R. Hammond. Feb. 19, 1947. 625,877.

Production of cellular polyethylene.—Expanded Rubber Co., Ltd., A. K. Unsworth, A. G. Goodchild, and A. Cooper. Feb. 27, 1947. 626,151.

Synthesis of α-acylamido-β, β-dimethylacrylic acids and esters thereof.—Merck & Co., Inc. March 22, 1946. 625,949.

Polymerisation of compounds containing the ethylenic double bond.—E. I. Du Pont de Nemours & Co. March 16, 1946. 626,155.

Nitrocellulose preparations. — I.C.I., Ltd., and J. Taylor. April 18, 1947. 625,996.

Process for the manufacture of 2-methyl-3-aralkoxy-4: 5-disubstituted-pyridine derivatives and vitamin B_6 derived therefrom.—Roche Products, Ltd., A. Cohen, and E. G. Hughes. April 18, 1947. 625,997.

Process for the manufacture of 2-amino-6-hydroxy-8-pteridyl aldehyde.—Roche Products, Ltd. April 23, 1947. 626,171.

Polymerised chloroprene-cashew nut shell liquid composition.—Harvel Corporation. May 26, 1939. 626,032.

Treatment of nitrogen-containing condensation polymers.—J. W. Fisher, H. Bates, and E. W. Wheatley. Oct. 12, 1945. 626,525.

Compositions of nitrogen-containing linear condensation polymers and the production of shaped articles therefrom.—J. W. Fisher, E. W. Wheatley, and G. W. I. Sheavyn. Oct. 12, 1945. 626,526.

Production of polymeric materials.—J. W. Fisher, and E. W. Wheatley. Feb. 7, 1946. 626,527.

Process for the treatment of sulphuric acid extracts of olefinic hydrocarbons.—C. Arnold. May 22, 1946. 626,466.

Method for the preparation of 4-hydroxy quinoline.—C. C. Price, and R. H. Reitsema. June 4, 1945. 626,472.

Methods of making substituted dihydroimidazolium compounds. — Monsanto Chemical Co. July 14, 1945. 626,473.

Methods of making dihydroimidazolium compounds.—Monsanto Chemical Co. July 14, 1945. 626,474.

Methods of preparing substitute imodazolium compounds.—Monsanto Chemical Co. July 14, 1945. 626,475.

Manufacture of derivatives of ethyl naphthalene.—Koppers Co., Inc. July 13, 1945. 626,313.

Methods of making substituted dihydroimidzaolium compounds. — Monsanto Chemical Co. July 14, 1945. 626,314.

Synthetic oils and resins and methods of producing same.—Solar Manufacturing Corporation. Aug. 17, 1945. 626,317.

2-Mercapto-4-keto-5, 6-dihydro-1, 3-thiazine and method of preparing same.—B. F. Goodrich Co. Oct. 5, 1945. 626,486.

Production of acid calcium phosphates and of calcium nitrate from raw phosphate and nitric acid.—Directie Van De Staatsmijnen in Limburg. Sept. 5, 1942. 626,491.

Production of dextroratory α, γ-dihydroxy-β, β-dimethyl butyric acid.—Merck & Co., Inc. Oct. 23, 1945. 626,498.

Process for preparing light magnesium hydroxide.—D. V. N. Hardy, D. G. Grant, and A. J. V. Underwood. Nov. 23, 1946. 626,503.

Methods for preparing organo-silicon halides.—British Thomson-Houston Co., Ltd. Dec. 8, 1945. 626,353.

Partial depolymerisation of highly polymerised polymethyl methacrylate.—Dohm, Ltd., and C. A. Redfarn. Jan. 1, 1947. 626,505.

Colour of aqueous solutions of saturated acid sulphuric acid esters or of saturated sulphonic acids or the salts thereof.—N.V. De Bataafsche Petroleum Maatschappij. Feb. 20, 1946. 626,377.

Photographic diazotype compositions containing N-acylamino phenol couplers.—General Aniline & Film Corporation. May 8, 1946. 626,391.

Process for the manufacture of pentaenes.—Roche Products, Ltd. (F. Hoffmann-La Roche & Co., A.G.). April 3, 1947. 626,392.

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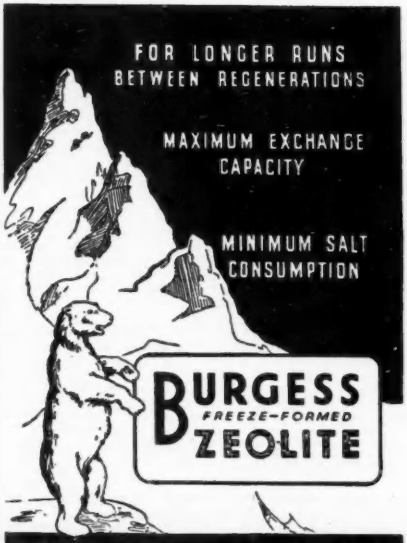

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SITUATIONS VACANT

None of the vacancies in these columns relates to a man between the ages of 18 and 50 inclusive, or a woman between the ages of 18 and 40 inclusive, unless he or she is exempted from the provisions of the Control of Engagement Order, or the vacancy is for employment exempted from the provisions of that order

APPLICATIONS are invited from **QUALIFIED ENGINEERS,** B.Sc. or A.M.I.Mech.E., for important Chemical Works, Manchester area. Applicants should not be over 40 years of age, and have experience in Maintenance, Chemical Plant Erection and Design. Position offered is permanent and progressive. Only men of proved ability need apply. Address in first instance, with particulars of qualifications and experience in detail, and salary expected. Box No. 2828, THE CHEMICAL AGE, 154, Fleet Street, London, E.C.4.

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CHEMICAL ENGINEER required for research and development work on utilisation of local mineral resources and development of industries based on hydro-electric power. Applicants should have good scientific qualifications, also good (and preferably varied) industrial experience. Position offers considerable scope for person with initiative and ability to tackle new problems. Age about 35-40. Salary £1200-£1500 per year according to qualifications. 3 years' agreement. Free accommodation. Liberal leave. Moderate Income Tax. Applications to DR. A. J. V. UNDERWOOD, 38, Victoria Street, London, S.W.1.

SITUATIONS VACANT

ASSISTANT WORKS ENGINEER required for construction and maintenance of Chemical Works in West Riding, Yorkshire. Applicant should be 25–35 years of age. Should have sound theoretical training and practical experience in mechanical engineering and chemical works plant. Salary approx. £600 p.a. Pension Scheme. Applicants should state age, full details of training and experience to WORKS MANAGER, Box No. 2834, THE CHEMICAL AGE, 154, Fleet Street, London, E.C.4.

JOHNSON & PHILLIPS invite applications for a **CHEMIST** to take charge of their Rubber and Thermoplastics Cable Laboratory, under the direction of the Chief Rubber Technologist. Applicants must hold a Degree or its equivalent, in Chemistry, and must have a thorough knowledge of, and experience in, laboratory work associated with the production of rubber and thermoplastic cable insulants and coverings. They must also be capable of controlling staff and organising routine development work in the preparation of rubber and thermoplastic compounds and of undertaking investigations into the methods of processing. The appointment carries a salary commensurate in the first instance with the applicant's qualifications and experience, and offers good prospects to a man possessing ability and initiative. Applications, stating age, full particulars of experience, training and salary required, should be addressed to **Employment and Welfare Manager, Johnson & Phillips, Ltd., Charlton, London, S.E.7.**

JOHNSON & PHILLIPS invite applications from men with thorough experience in the Rubber Cable Industry for appointment as **DEPUTY TO THE CHIEF RUBBER TECHNOLOGIST.** Candidates must have expert knowledge of compounding methods for natural and synthetic rubbers and thermoplastics, and be thoroughly conversant with the design, construction and application of all types of rubber and thermoplastic cables. The appointment carries a salary commensurate in the first instance with qualifications and experience. It affords wide scope for initiative and ability, and offers excellent prospects. Applications, stating age, full particulars of experience, training, and salary required, should be addressed to the **Employment and Welfare Manager, Johnson & Phillips, Ltd., Charlton, London, S.E.7.**

JOHNSON & PHILLIPS invite applications for an **ENGINEER** to be responsible to the Cable Works Manager and to undertake the technical supervision of processes in the manufacture of rubber and thermoplastic cable, in close liaison with the chemical and technical staff. Candidates must have thorough experience of works' practice in the handling of rubber and thermoplastic compound and associated materials and must be capable of co-operating in development work associated with the translation of new materials and methods from laboratory to factory production. The appointment carries a salary appropriate to the applicant's experience and offers wide scope for the exercising of initiative and intelligence. Applications, stating age, full particulars of experience, training, and salary required, should be addressed to **Employment and Welfare Manager, Johnson & Phillips, Ltd., Charlton, London, S.E.7.**

LABORATORY SUPERVISOR required for the routine control laboratory of a chemical works in the West Riding of Yorkshire. Previous experience of inorganic analysis an advantage. Preference will be given to applicants between the ages of 28 and 35 years. Salary, £350-£416 per annum, according to experience. Box No. 2824, THE CHEMICAL AGE, 154, Fleet Street, London, E.C.4.

SITUATIONS VACANT

RESEARCH CHEMISTS. The Midland Tar Distillers, Ltd., Oldbury, Near Birmingham have vacancies in their research department for chemists with good degrees in chemistry. A few years industrial experience an advantage. Good salaries will be paid to qualified men, and a contributory pension scheme is in operation Apply with full particulars to PERSONNEL MANAGER.

THE Civil Service Commissioners invite applications for permanent appointments as **ASSISTANT EXPERIMENTAL OFFICER** to be filled by competitive interview during 1949. Interviews will be held shortly after the receipt of the completed application form and successful candidates may expect early appointments.

The posts are in various Government Departments and cover a wide variety of scientific (including engineering) qualifications. Places of work are spread throughout Great Britain.

Candidates must be at least 17½ years and under 26 years of age on 1st August, 1949; time spent on a regular engagement in H.M. Forces may be deducted from actual age. Candidates must have obtained the Higher School Certificate with mathematics or a science subject as a principal subject. or an equivalent qualification. Higher qualifications will be regarded as an advantage to candidates over the age of 20.

The inclusive London salary scale (men) is £230–£490 Salaries for women and for posts in the provinces are somewhat lower. Superannuation provision is made under the Superannuation Act.

Further particulars and forms of application from the Secretary, Civil Service Commission Scientific Branch, 27, Grosvenor Square, London, W.1. quoting No. 2522. Completed application forms should be returned as soon as possible.
2333 300.

THE Midland Tar Distillers Ltd., Oldbury, Near Birmingham, require **CHEMICAL ENGINEERS** possessing a Degree in Chemical Engineering or A.M.I.Chem.E. Applicants must have had several years industrial experience in chemical engineering and development work. A first hand knowledge of the oil refining industry an advantage. Full particulars to PERSONNEL MANAGER.

WORKS MANAGER required for plant in Scotland. Applicants should have Chemical and/or Engineering background and preferably experience with the carbonisation process. Good salary for the right man. Candidates should give full particulars of age, qualifications and experience. Box No. 2833, THE CHEMICAL AGE, 154, Fleet Street, London, E.C.4.

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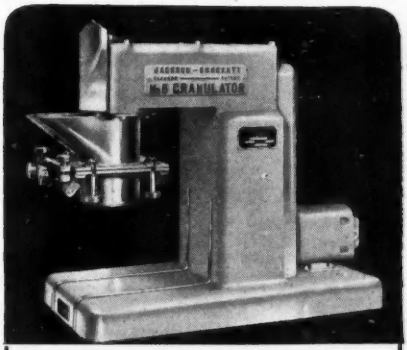

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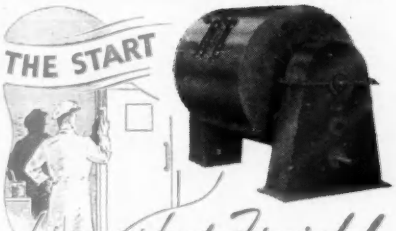

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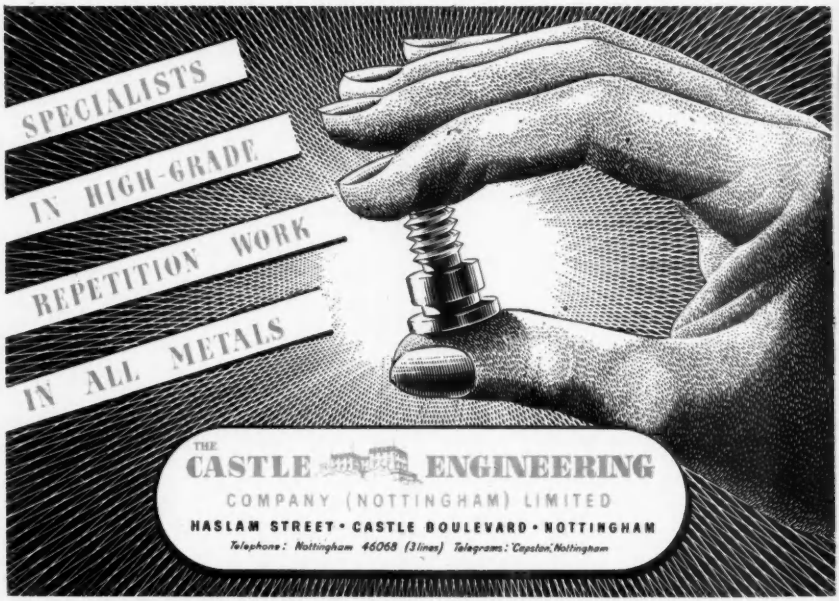

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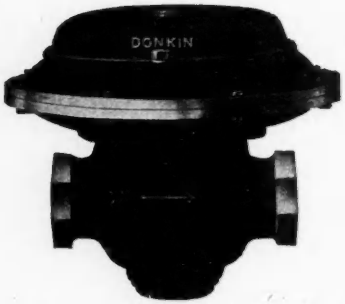

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